5.0 Physical and Environmental Analysis

The analysis in this chapter is based on the area of evaluation for each alternative (shown in Figures 2.1-5, 2.1-6, and 2.2-1). These "areas of evaluation" were defined based on general design assumptions, estimated construction limits, potential additional right-of-way needed for stormwater management and other related transportation functions, and other design factors. Staging areas, if needed outside the areas of evaluation, will be identified for the preferred alternative and evaluated in the Final Environmental Impact Statement (EIS).

For the No Build Alternative, the area evaluated includes the existing right-of-way of the reroute roads.

For the Existing US 53 Alternative, the area evaluated includes the existing right-of-way/easement agreement area of existing US 53.

The Alternative M-1 area of evaluation represents the assumed alignment for that alternative and extends to the estimated limits of construction.

The area of evaluation was widened for Alternatives E-1A and E-2 in areas where there is potential for design adjustments in the alignment to accommodate currently undefined solutions to known engineering challenges (e.g., existing areas of unstable fill and bridge type). The intent of evaluating the wider area for Alternatives E-1A and E-2 was to identify potential impacts and determine if there were any environmental resources that could limit implementation of the design options being considered. As determined by analysis of aerial photography and data collection within the widened areas of evaluation across the Rouchleau Pit for Alternatives E-1A and E-2, there is generally consistent vegetation/cover types (i.e., mostly forested with some wetlands, or rock pit walls and water) and no existing development or noise receptors. Since most of the widened area is within the previously mined area in and adjacent to the Rouchleau Pit, the alignment adjustments should result in little difference in impacts to resources except for ferrous resources and right-of-way. Impacts to vegetation and wetlands were determined to be similar regardless of where the final alignment would be oriented within the widened area. To calculate potential impacts without overestimating them due to the widened area of evaluation, a corridor averaging 200-400 feet wide was assumed for Alternative E-1A, and a corridor averaging 150-300 feet wide was assumed for Alternative E-2 (the Alternative E-1A RSS Option requires a larger footprint).

5.1 Utilities

The objective of this section is to use currently available information to evaluate the potential impacts to existing utilities from each project alternative. This section includes:

- The public and private utilities potentially impacted by the project
- The general service area for these utilities
- The utilities' proposed approaches to relocation

5.1.1 Regulatory Context and Methodology

5.1.1.1 Regulatory Context

The utilities described in this section are located within the Minnesota Department of Transportation (MnDOT) US 53 right-of-way corridor, which includes the highway's existing easement agreement area on lands owned by RGGS. The utilities are located within US 53 right-of-way by way of revocable permits issued by MnDOT. The applicable terms of all such permits make each utility responsible for costs and management of its facilities along the highway, including within the RGGS-owned existing easement agreement area. Therefore, MnDOT and RGGS are under no obligation to provide for utility relocations or other accommodations. However, MnDOT must provide adequate notification to utilities to prepare for needed relocations.

The typical relocation policy of MnDOT involves accommodating utilities within its road rights-of-way, via a revocable permit, when feasible.

5.1.1.2 Methodology

The study area for utilities includes the existing easement agreement area/right-of-way of US 53 and roadways that would be designated as the US 53 reroute for the No Build Alternative. It also includes the areas within and directly adjacent to the Alternative M-1, E-1A, and E-2 corridors.

5.1.2 Existing Conditions

There are two public and four private utility operators located within the existing easement agreement area of the US 53 corridor right-of-way. Each has a permit from MnDOT to locate their respective utilities within the US 53 existing easement agreement area. Some of these utilities are also located within the MN 37, Co. 7, and Co. 101 corridors that make up the No Build Alternative reroute for traffic. Northeast Services Cooperative is one utility owner that is located along Co. 7, Co. 101, and Landfill Road but is not located within the existing easement agreement area.

The utility owners were invited to a meeting with MnDOT in August 2012 to discuss the need to relocate and to obtain information about existing utilities and potential relocation plans. A representative from each utility listed in Table 5.1.-1 attended the meeting.

Table 5.1-1 summarizes the utilities located within the existing easement agreement area and their respective service areas.

Table 5.1-1. Summary of Existing US 53 Corridor Utilities in the Existing Easement Agreement Area

Utility Provider	Public or Private	Utility Services Within Corridor (Type)	Service Area Notes
City of Virginia	Public	Sanitary sewer (18" pipe; manholes) and storm sewer (ditches and pipes)	City of Virginia and Midway area; sanitary service line to Midway is a secondary line; storm sewer serves Landfill Road to 2nd Avenue interchange area with outlet to Rouchleau Pit, Minnewas Pit, and Manganika Creek
Virginia Department of Public Utilities (VPU)	Public	Water (10" pipe), electrical (overhead lines), and gas (3" low-pressure line)	Cities of Virginia (including 430 customers in the Midway area), Gilbert, and Eveleth
Minnesota Power	Private	Power/electrical (overhead lines)	Two main distribution lines serve communities to the south and east, including Eveleth, Gilbert, and Biwabik
CenturyLink	Private	Communication (nine 4" PVC conduits with concrete vaults at about 750-foot spacing)	Feeds Quad Cities area cell phone towers; toll, local, and long distance service from Virginia to Midway (Virginia), Eveleth, Gilbert, and Biwabik; serves St. Louis County
Mediacomm	Private	Communication (one fiber optic cable)	Telephone, internet, and cable TV service to approximately one-half of Virginia
Paul Bunyan Communications	Private	Communication (one fiber optic cable)	Ethernet service from Eveleth to Duluth and service to 12 cell phone towers

City of Virginia (Sanitary Sewer and Storm Sewer)

The City of Virginia's sanitary sewer facilities within the existing US 53 corridor consists of 18-inch PVC sanitary sewer (see Figure 5.1-1). The existing main was constructed in 2003/2004 and is located on the south side of the US 53 existing easement agreement area. The main is a gravity line consisting of pipe with concrete manholes located at approximately 200-foot to 400-foot intervals. Pipe grades vary between 0.25 and 9 percent. The main provides a second intermediate connection to a separate sanitary

main that serves the Midway community. The wastewater treatment plant is located just west of the 2nd Avenue interchange loop, on the south side of US 53.

The City of Virginia's storm sewer facilities within and/or adjacent to the existing US 53 corridor consist of pipes and ditches that direct runoff from the east and west sides of the Rouchleau Pit to Manganika Creek. This system includes the Minnewas stormwater diversion pipe which diverts surface drainage coming from as far as the St. Louis County Landfill into a small inactive mine pit (the Minnewas Pit), located northwest of the junction of US 53 and MN 135. The diversion pipe was installed in 2000 to reduce flooding near 2nd Avenue and Southside Park (see Figure 5.1-1). Prior to the installation of the diversion system, surface runoff caused flooding in the vicinity of the 2nd Avenue interchange and 6th Avenue ball fields (Virginia's Southside Park). In 1993-1994, two major rain events resulted in a breach of the east pit ditch, directing runoff directly into the Rouchleau Pit. There is currently a pipe in this breach location that allows some discharge directly into the Rouchleau Pit.

This stormwater system, including the Minnewas Pit, includes a series of interconnected surface drainage ditches and pipes and manages flows from east to west, including drainage from Midway, the east pit area, the US 53 existing easement agreement area, and downtown Virginia. The system parallels much of the Landfill Road segment within the Alternative E-2 corridor with some diversion into the Minnewas Pit, and continues down-grade to the west along the north side of US 53 as it approaches 2nd Avenue in Virginia. This ditch is located partially within the existing easement agreement area. Near the east side of the US 53 interchange loop with 2nd Avenue, large-diameter reinforced concrete pipes direct this surface drainage across US 53 toward Manganika Creek. On the west side of the 2nd Avenue interchange loop, additional culverts cross US 53 at the old railroad grade directing downtown water to Manganika Creek.

Virginia Department of Public Utilities (Water, Electric, and Gas)

The VPU provides electrical, water, and gas service to the city of Virginia and surrounding communities (see Figures 5.1-1 and 5.1-2). In general, VPU's facilities along the existing US 53 corridor (existing easement agreement area) serve approximately 430 customers in the Midway neighborhood. VPU provides and maintains the utility services.

Within the existing US 53 corridor, VPU water utility consists of a 10-inch PE water main that runs from 2nd Avenue West along the north side of US 53 and continues along MN 135 to Bourgin Road. The main continues down Bourgin Road and provides a continuous connection to the Midway water tower. The main is also part of the interconnect system with Eveleth and Gilbert. The Eveleth and Gilbert connections are normally shut off but can provide emergency service to the communities if needed. There is also a booster station located within the US 53 corridor (in the existing easement agreement area near the 2nd Avenue interchange) consisting of two pumps within a block building shed enclosure.

VPU's electrical facilities within the existing US 53 corridor consist of overhead high voltage (13.8 kW/ 7.97 kW) running on the south side of the highway between Virginia and Midway. VPU's system is co-located on Minnesota Power's utility poles through a portion of the corridor. The overhead facility is fed from a substation near 6th Avenue, south of US 53, and serves the Midway neighborhood.

VPU's gas facilities within the existing US 53 corridor consist of three-inch low pressure gas line (less than 60 psi). The gas line runs along the south side of the highway to a regulator station in Midway. From this point the line continues on to residential feed points in Midway. A separate line doubles back along the US 53 corridor and to the north to Bourgin Road via the south side of MN 135 to a regulator station at Anderson Road, which provides a second feed to Midway for system redundancy in the event that either line is interrupted.

Minnesota Power (Power/Electrical)

Minnesota Power's existing facility within the US 53 corridor consists of two main distribution lines consisting of three-phase overhead feeders. The lines are constructed to Minnesota Power's bulk distribution standards consisting of 336 ACSR wire and class three utility poles with heavy cross arms. The lines are located on the north and east side of US 53 and cross the highway near the western extent of the Rouchleau Pit.

Of the two main distribution lines, one serves the communities of Eveleth, Ely Lake, St. Mary's Lake, and surrounding areas. The other line serves Laskin Energy Center, Gilbert, Biwabik, and McKinley, and, in the future, is intended to serve Hoyt Lakes and Aurora. Minnesota Power provides and maintains the utility service.

CenturyLink (Communication)

CenturyLink's existing facility consists of a conduit system on the east side of existing US 53 that has nine four-inch PVC conduits with six-foot x 12-foot x seven-foot (width x length x depth) concrete vaults located at approximately 750-foot intervals. The conduit system contains three fiber optic cables and five copper cables. The lines are generally located at a depth of three feet. CenturyLink provides and maintains the utility service.

The fiber cables serve AT&T, Verizon, and Sprint cell phone towers in the Quad Cities area; provide toll and long distance service from Virginia to Eveleth; and provide toll and long distance service from Virginia to Biwabik.

The copper cables (900 and 1200 pair cable) provide local and long distance telephone and DSL service to Midway, Gilbert, and McKinley. The copper cables also serve the St. Louis County offices in downtown Virginia.

Mediacomm (Communication)

Mediacomm's existing facility within the US 53 corridor consists of a single 24-count fiber optic cable in conduit. The line is located to the west of the highway between Eveleth and approximately the Mineview in the Sky entrance at which point the facility crosses US 53 and continues on the east side of the highway to Virginia.

The facility provides telephone, internet, and cable TV service to approximately one-half of Virginia. The facility also supports Northeast Service Cooperative broadband network.

Paul Bunyan Rural Telephone Cooperative (Communication)

Paul Bunyan Rural Telephone Cooperative (Paul Bunyan Communications) has existing facilities within the US 53 corridor consisting of a 96-count fiber optic cable in conduit. The cable is located approximately 42 inches below grade and provides Ethernet[1] service from Eveleth to Duluth as well as providing service to several cell towers. Paul Bunyan Communications provides and maintains the utility service.

5.1.3 Environmental Consequences

The permits which allow for the utilities to be located within the MnDOT easement require each utility to be responsible for its operations and maintenance, and upon notice from MnDOT each utility must remove its infrastructure from the existing easement agreement area.

MnDOT's proposed action is driven by the RGGS existing easement agreement area terms, which require MnDOT to relocate US 53 from the existing easement agreement area. As a result, the direct impact to the utilities within this existing easement agreement area is the termination of the easement and subsequent termination of the utility permits. As such, MnDOT has initiated the termination notice process with each of the utilities. MnDOT notified each of the utilities described in this section (in letters dated May 4, 2012) of the US 53 project background and stated that all utilities must relocate from the existing easement agreement area by October 2016. Formal notice and orders are anticipated by early 2015.

MnDOT's US 53 project team met with representatives of the utilities on August 15, 2012. At this meeting, MnDOT explained its applicable policies and discussed the constraints of the project, including the following points:

[1] A system for connecting a number of computer systems to form a local area connection

- MnDOT's policy is to accommodate utilities where it is feasible to do so. However, due to the complexities and constraints of the project, MnDOT is currently uncertain that the relocated highway will be able to accommodate any utility facilities, especially in the Alternative M-1 corridor due to lack of support by the mine operator.
- If the new highway corridor is determined to be able to accommodate utilities, it is anticipated that the space available for installation of and access for maintenance and repairs to any facility may be severely limited due to constraints in roadway (embankment or bridge) sections and right-of-way width, steep inslopes, operation requirements of adjacent mining facilities, and other factors that may be determined as the highway design process continues. It is anticipated that a utility box/conduit would be required for most utilities in the steep sloped areas for maintenance access and for slope protection in the event of utility failure. If any additional right-of-way or infrastructure is required to accommodate utilities, utility companies would be responsible for the additional costs.

Coordination with the utility companies is ongoing to see if utilities can be accommodated. Although MnDOT's Utility Accommodation Policy cites that under certain conditions gas lines may be accommodated on bridges, it is not recommended for this project because of the high risk a gas line poses to bridge workers and the traveling public due to the susceptibility to flyrock hits from nearby blasting operations. The placement of a gas line on a high profile bridge, such as is proposed for Alternatives E-1A and E-2, poses homeland security concerns that would be difficult to mitigate with the level of gas line system monitoring that would be necessary.

In order to evaluate the greatest potential impact of utilities being located within the corridors of the Build Alternatives, additional right-of-way width was assumed where possible (for Alternatives E-1A and E-2). There were essentially no differences in impacts to utilities among the options considered (Alternative E-1A RSS Option, Bridge Option, Intersection Option, and Interchange Option; Alternative E-2 Straight Option, Curved Setback Option, Intersection Option, and Interchange Option). The utility owners and the St. Louis and Lake Counties Regional Railroad Authority (SLLCRRA) have received state bond funds for relocation of utilities and the Mesabi Trail.

Table 5.1-2 provides a summary of the utilities' proposed approach to relocation.

Table 5.1-2. Summary of US 53 Corridor Utilities' Proposed Approach to Relocation

Utility Provider	Utility Preference – Proposed Relocation Approach
City of Virginia	The City of Virginia will seek to relocate its sanitary facilities within the right-of-way of the preferred alternative with a system essentially identical to the existing system. Relocation into any Build Alternative would likely require construction of a sanitary force main system due to alignment requirements. Impacts to the stormwater system will need to be assessed and coordinated with RGGS, the City of Virginia, and adjacent mining interests.
Virginia Department of Public Utilities (VPU)	VPU will seek to relocate its facilities within the right-of-way of the preferred alternative with a system essentially identical to the existing system. A constrained cross section through the mine pits for any of the Build Alternatives would make the location of utilities in this corridor difficult. VPU requests consideration of a corridor on one side of the roadway for utilities and trail use.
Minnesota Power	Minnesota Power likely will seek to relocate its existing facilities such that one line would follow the preferred alternative alignment and the other line would follow a separate alternate route to provide redundancy for emergency service. Minnesota Power's preference is for its power lines to remain overhead. In the event that an overhead facility is not feasible, a more costly underground facility can be provided.
CenturyLink	CenturyLink will seek to relocate its existing facility on a separate alternate route with a system similar to the existing: nine conduits with manholes every 750 feet to 1,000 feet.

Utility Provider	Utility Preference – Proposed Relocation Approach
Mediacomm	Mediacomm will seek to relocate its existing facility within the right-of-way of the preferred alternative with a system essentially identical to existing, consisting of 1.5-inch Schedule 40 conduit with a bury depth of 36 inches. An access vault at either end of the preferred alternative's departure from and re-connection to the existing US 53 alignment will be required.
Paul Bunyan Communications	Paul Bunyan Communications will likely seek to relocate its existing facility on a separate alternate route with a system similar to the existing. An access vault (handhole) at either end of the reroute may be needed.
Northeast Services Cooperative	Northeast Services Cooperative may be impacted by the relocation/reconstruction of or near Landfill Road. It would seek to relocate its existing facility within the new Landfill Road right-of-way.

5.1.3.1 No Build Alternative (Easement Agreement Area Closed)

Under the No Build Alternative, MnDOT would terminate the existing utility permits, and the utilities within the US 53 existing easement agreement area would remove their infrastructure.

This alternative does not create a corridor that utility owners could consider for rerouting their respective services. The reroute roadway corridors may be considered. The designated reroute of US 53 would add several (up to 22) miles to the length of the utility infrastructure. The cost for each utility would vary based on the infrastructure required. Each utility would be responsible for relocating its infrastructure from the existing easement agreement area.

5.1.3.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)

Under the Existing US 53 Alternative, the potential need for utilities along US 53 to relocate their infrastructure would be eliminated

5.1.3.3 Alternative M-1

MnDOT would provide formal termination notice for the existing utility permits by early 2015, although utility owners have already been informed of the necessary relocations. The utilities within the US 53 existing easement agreement area would need to be relocated by October 2016 to allow MnDOT to vacate the easement agreement area by May 2017.

Due to access restrictions for maintenance within the active mine and the constrained cross-section (without a trail) to minimize ferrous resource impact, this alternative cannot accommodate a new utility corridor that utility owners could consider for rerouting their respective services; other alignment options would need to be considered. The cost for each utility would vary based on the infrastructure required. Each utility would be responsible for relocating its infrastructure from the existing easement agreement area.

5.1.3.4 Alternative E-1A

MnDOT would provide formal termination notice for the existing utility permits by early 2015, although utility owners have already been informed of the necessary relocations. The utilities within the US 53 existing easement agreement area would need to be relocated by October 2016 to allow MnDOT to vacate the easement agreement area by May 2017. This alternative may also require modification to the stormwater system along Landfill Road and near the existing US 53/2nd Avenue interchange.

This alternative may permit a new corridor on the north side of the alignment that utility owners could consider for rerouting their respective services; however, other options should be considered. The cost for

each utility would vary based on the infrastructure required. Each utility would be responsible for relocating its infrastructure from the existing easement agreement area.

5.1.3.5 Alternative E-2

MnDOT would provide formal termination notice for the existing utility permits by early 2015, although utility owners have already been informed of the necessary relocations. The utilities within the US 53 existing easement agreement area would need to be relocated by October 2016 to allow MnDOT to vacate the easement agreement area by May 2017. This alternative may also require modification to the stormwater system along Landfill Road and near the existing US 53/2nd Avenue interchange.

This alternative may permit a new corridor that utility owners could consider for rerouting their respective services; however, other options should be considered. The cost for each utility would vary based on the infrastructure required. Each utility would be responsible for relocating its infrastructure from the existing easement agreement area.

5.1.4 Avoidance, Minimization, and Mitigation Measures

The impact to utilities within the existing easement agreement area is not caused by the US 53 relocation project; rather, it is the result of the termination of easement rights by RGGS and UTAC. However, the planning and technical assistance provided through the US 53 EIS process can serve to minimize adverse impacts to utilities caused by the termination of the easement by providing opportunities for utilities to relocate within the preferred alternative as described in Section 5.1.4.1. While specific outcomes cannot be determined at this stage of analysis, the following measures will be considered in the planning process.

5.1.4.1 Avoidance and Minimization

Minimization of Conflicts with Utilities Currently in Place

As the preferred alternative is refined and designed in detail, highway designers will continue to coordinate with utilities to minimize conflicts. For example, a portion of US 53 within the existing easement agreement area (Cuyuna Drive to MN 135) is proposed to be retained for future highway use, and this might also perpetuate use by some utilities pending additional planning and easement negotiation with RGGS.

Highway Design and Accommodation of Utilities

Based on discussions with utility providers, a newly constructed US 53 corridor would represent a route to consider for co-location of utilities. The Build Alternatives (Alternatives M-1, E-1A, and E-2), with the assumed constrained cross sections through respective mine pits, may not have adequate space to provide for co-location of all utilities in a manner similar to the existing US 53 corridor. As noted in Table 5.1-2, VPU initially requested consideration of a 20-foot corridor on one side of the roadway for utilities with a 1:4 slope.

The potential for added costs for a wider highway cross section (additional right-of-way) or other accommodations, compared to alternate utility routes, warrants further study and coordination with the utilities that would be responsible for the added costs. MnDOT is prepared to consider design modifications (such as utility box for slope protection and access) to accommodate co-location with utilities. However, costs associated with such modifications would need to be evaluated by each utility operator in determining their feasibility to co-locate since mitigation is not required by MnDOT. The corridors assumed for Alternatives E-1A and E-2 (averaging 200-400 feet wide and 150-300 feet wide, respectively) within the areas of evaluation included potential area for utilities on the northeast side of the roadway. If utilities are located elsewhere, the construction limits could be narrowed. Any utilities that may be relocated within the new US 53 right-of-way, would be established via a revocable permit issued by MnDOT, with construction funded by the utility owners.

Funding Sources

The utility owners and SLLCRRA have received state bond funds for relocation of utilities and the Mesabi Trail.

5.2 Water Supply

NOTE TO READER: Water resource-related issues are discussed in a number of different sections of this Draft EIS. To facilitate cross-referencing coverage of water resources issues, the following summary of topics and Draft EIS sections may be useful.

Section	Content
5.2. Water Supply	■ Public water supply source-waters, users, and potential project impacts on source water quality and accessibility (i.e., potential for dewatering drawdown impacts on water supply intakes) ■ Includes discussion of the Rouchleau Pit as the source water for the city of Virginia and for the ArcelorMittal Mine
5.3. Waterbody Modification	■ Discusses potential waterbody physical modifications (e.g., filling or hydraulic impacts associated with dewatering activities) ■ Includes descriptions of methods for construction dewatering for the two project alternatives that cross the Rouchleau Pit (Alternatives E-1A and E-2) ■ Alternative E-1A RSS Option includes one construction method that could include an approximate 30-foot drawdown of the Rouchleau Pit. Potential receiving waters for dewatering discharges for the drawdown method are also described in this section.
5.4. Wetlands	■ Discusses impacts to surface waterbodies that meet the regulatory definition of wetlands
5.5. Surface Water Runoff: Quantity and Quality	■ Describes potential surface water runoff (stormwater) impacts during and after construction and proposed mitigation (stormwater conveyance and treatment) ■ Includes discussion of spill containment

This section focuses on the potential for impacts to the Rouchleau Pit, which is the water supply source-water for the city of Virginia and for the ArcelorMittal Mine. Impacts considered in this section include water quality and accessibility (i.e., potential for dewatering drawdown impacts on water supply intakes).

The evaluation of potential water supply impacts within the study area includes information derived from technical reports (Source Water Assessment for the city of Virginia (MDH, May 2003); TH 53 Relocation Alternative E-1A RSS Construction Option Water Management Study (HDR, 2014; provided in Appendix G) and a bathymetric survey (MnDOT, 2013)) (see Figure 5.2-1). These reports are incorporated herein by reference.

5.2.1 Regulatory Context and Methodology

5.2.1.1 Regulatory Context

The federal Safe Drinking Water Act (SDWA) (42 USC 300(f)) establishes National Primary Drinking Water Standards for the protection of aquifers. A list of drinking water contaminants can be found online.[2] The Minnesota Department of Health (MDH) is the state regulator for public water supply sources through its Drinking Water Protection Program. This program includes preparation of a Source Water Assessment for public water supplies. The MDH prepared a Source Water Assessment for Virginia, which was published in May 2003.

[2] USEPA, http://water.epa.gov/drink/contaminants/

Other applicable laws and regulations for water supply include:

- The Clean Water Act of 1972, amended in 1987 (33 USC 1251)
- MDH Water Well Construction Code (Minnesota Rules, Chapter 4725)

5.2.1.2 Methodology

The analysis in this section focuses on the potential for impacts to the Rouchleau Pit, which is the water supply source-water for Virginia and the ArcelorMittal Mine. The City of Virginia (Virginia Department of Public Utilities [VPU]) draws its drinking water and cooling water for its power plant from the Rouchleau Pit, and the ArcelorMittal Mine uses water from the Rouchleau Pit as a source of backup water for its mining operations and diverts flow to supplement the Sauntry Creek system which flows through Bailey (also known as Virginia) and Silver Lakes in Virginia. The analysis looked at potential changes to water quality and access/availability of the Rouchleau Pit as the source of water for these users.

- City of Virginia

The MDH completed a Source Water Assessment for Virginia in May 2003. For the assessment, MDH defined an area which supplies water to the Virginia water utility. The source water assessment area for Virginia contains an inner emergency response area and an outer source water management area.

As depicted in the MDH report (see Figure 5.2-2), the source water assessment area is generally east and northeast of Virginia, with US 53 and MN 135 marking the southern extent of the area. The Inner Emergency Response Area is located within the Source Water Assessment Area and was identified as an area where contaminant releases could present an immediate health concern to the citizens and businesses that receive water from this system. The Inner Emergency Response Area is defined by the amount of notification time the city needs to close the surface intake plus a buffer to accommodate unanticipated delays in notification and shut down. This area is equivalent to the surface watershed surrounding the Rouchleau Pit that drains directly into the pit. The Outer Source Water Management Area is defined by the groundwater divide around the Rouchleau Pit that was estimated by the MDH on the basis of available data including surface topography, the configuration of the Biwabik Iron Formation in the area, water levels in surrounding lakes and flooded mine pits, and water levels in surrounding wells. The existing US 53 easement agreement area under examination in this EIS, including US 53 and MN 135, is not within these source water areas.

The VPU pumps its potable water from the northwest end of the Rouchleau Pit (just east of downtown Virginia), previously known as the Mesabi Mountain Mine Pit. This intake is approximately 1.4 miles from the existing US 53 roadway (via water surface). Due to the rising water levels within the pit since mining in this pit ceased, the Mesabi Mountain Mine Pit and Rouchleau Pit (south end) are now connected, creating one large waterbody that will continue to be referred to as the Rouchleau Pit in this discussion. Since the Rouchleau Pit is a surface water, it is considered highly susceptible to contamination. For purposes of the SDWA, susceptibility is defined as the likelihood that a contaminant would enter a public water supply at a level which may result in an adverse human health impact. However, the MDH Source Water Assessment notes that, "While it has been determined that Virginia's source water is highly susceptible to contaminants found in the lake [pit], historically the city's water plant has effectively treated this source water to meet or exceed safe drinking water standards." It also states that:

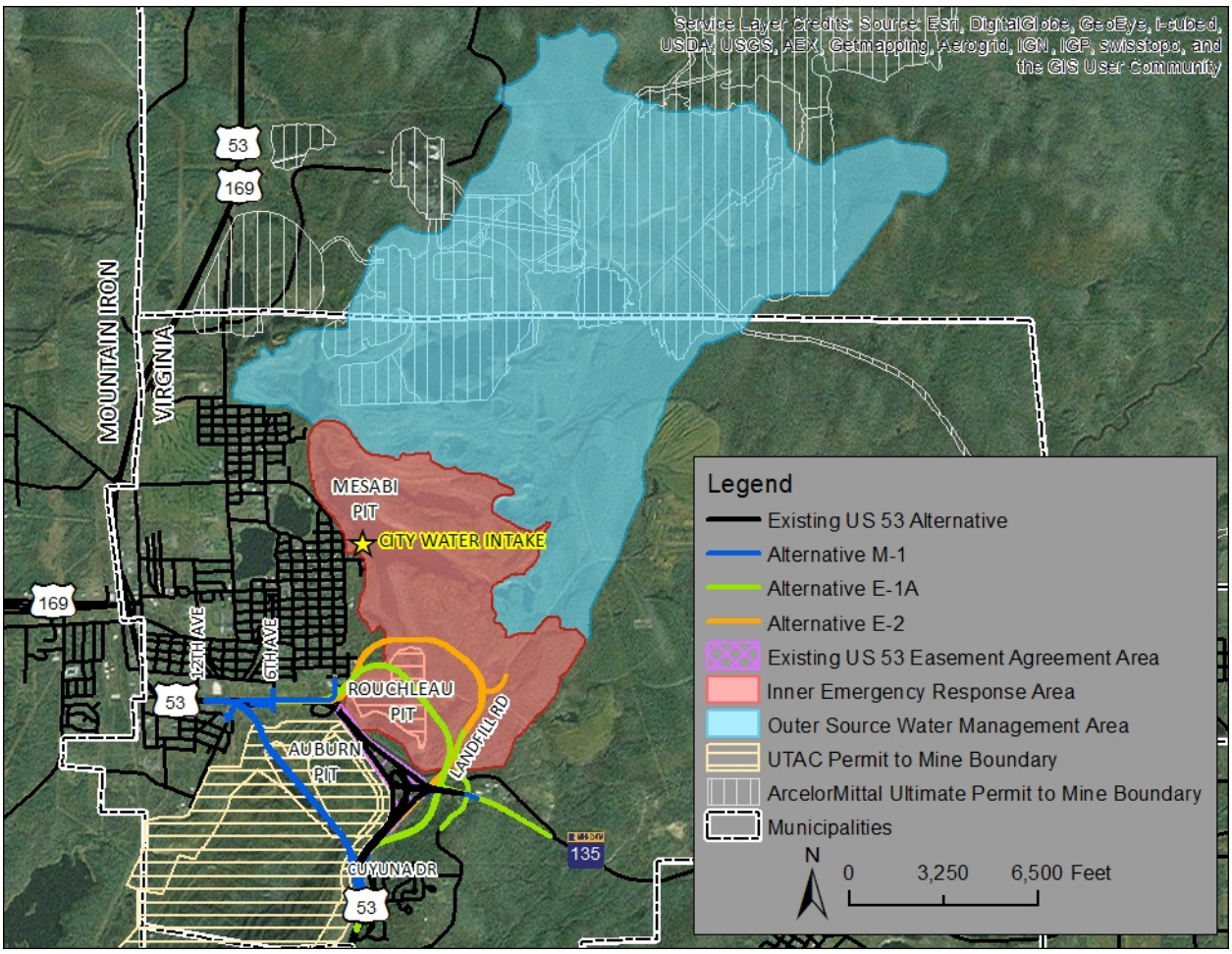
> "There is relatively little surface runoff into the pit; the majority of water in the Mesabi Mountain [Rouchleau] Pit is contributed by the surrounding surficial drift aquifer and the Biwabik Iron Formation Aquifer. The large volume of water in the Mesabi Mountain [Rouchleau] Pit helps to attenuate contaminant concentration and also affects the movement of contaminants to the public water supply intake. The closer the source of contamination is to the intake, the greater the impact on the quality of the water used by Virginia. The further the source of contamination is from the intake, the more likely that the influence of such contamination on the public water supply would be attenuated through dilution."

Therefore, city water supply impacts, for purposes of this Draft EIS analysis, are defined as potential for roadway-related water quality effects within the Inner Emergency Response Area (which includes the Rouchleau Pit), with regard to:

- Placement of roadway fill within the Rouchleau Pit
- Potential for Rouchleau Pit water quality impacts from roadway spills
- Potential for Rouchleau Pit water quality impacts from roadway surface runoff

In addition, the potential effects of a drawdown of the Rouchleau Pit, one of the construction methods for the Alternative E-1A RSS Option, on the VPU's and ArcelorMittal's water supply intakes were also assessed.

Figure 5.2-2. Virginia Source Water Assessment Area



- ArcelorMittal Mine

As noted previously, the ArcelorMittal Mine uses water from the Rouchleau Pit as a source of backup water for its mining operations, and it also diverts flow to supplement the Sauntry Creek system which flows through Bailey and Silver Lakes in Virginia. The mine transfers water from an intake at the far north end of the Rouchleau Pit to the southern end of the Enterprise Pit (just north of the Rouchleau Pit – see Figure 5.2-3). The mine pumps water for both process and potable water from a barge-mounted pumping system at the north end of the Enterprise Pit. It is conveyed through an overland pipe to the plant. At the plant it is split into process water and potable water. The potable portion is treated prior to use in the plant; the process water is not treated. Since the water use is just for the mine facility (i.e., not 'public'), no Source Water Assessment has been done by the MDH for this water use. However, since the mine

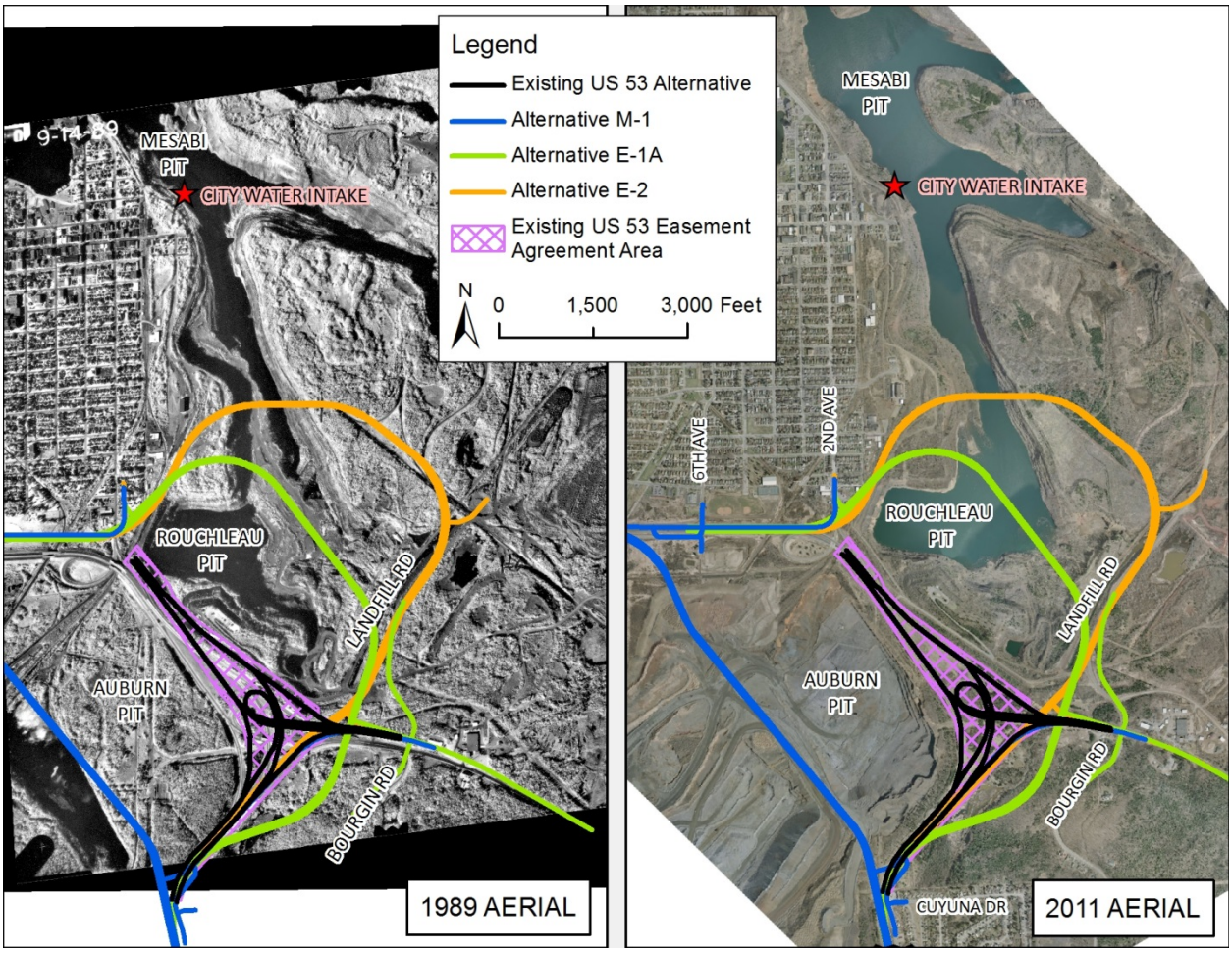
takes water from the north end of the Rouchleau Pit (northeast of the VPU's intake; two miles from US 53 easement agreement area), it is reasonable to assume that the area mapped as Virginia's Inner Emergency Response Area would be similar to the potential area of water quality concern for the ArcelorMittal Mine source water.

The assessment of impacts to the Rouchleau Pit as a source water for the ArcelorMittal Mine included potential for water quality impacts based on assessment of the same area as Virginia's Inner Emergency Response Area using the same method as for the city water supply, and the potential effects of a drawdown of the Rouchleau Pit, one of the construction methods for the Alternative E-1A RSS Option, on the water supply intake location/elevation.

5.2.2 Existing Conditions

As noted previously, there is one water supply resource within the project study area: the Rouchleau Pit. The Rouchleau Pit is one of several mined pits that make up the common waterbody immediately east of Virginia (Figure 5.2-4), referred to in total as the Rouchleau Pit.

Figure 5.2-4. Rouchleau Pit Historic Water Levels

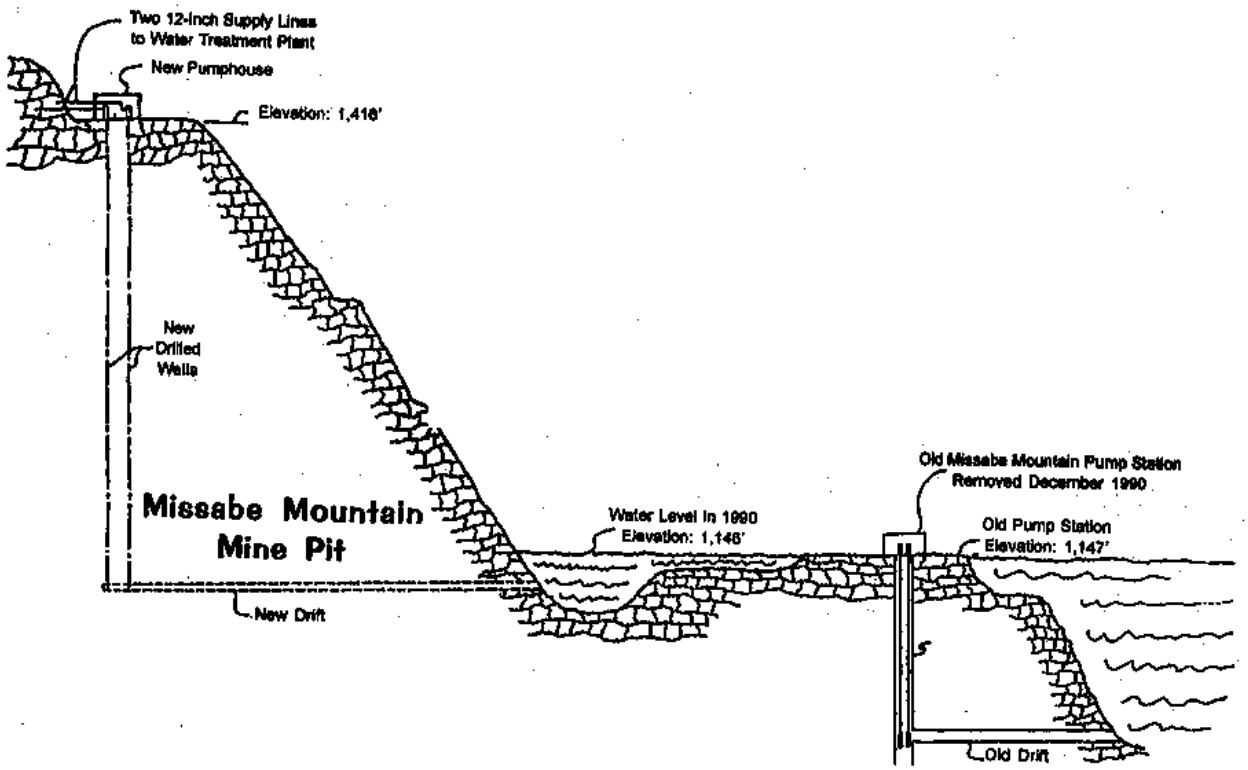


- City of Virginia Water Use

Virginia has been using the Rouchleau Pit as a water source since 1931. The City of Virginia has a DNR water appropriation permit (#1984-2037) for the use of the Rouchleau Pit (Mesabi Pit portion) as the municipal water source. Although the type and location of the intake has varied over time, the present intake system was installed in 1990 and consists of two 24-inch wells drilled down approximately 300 feet to a horizontal drift shaft (Figure 5.2-5). Two 2,000 gallon per minute (GPM) submersible pumps

supply the 2.1 million gallons per day (MGD) average daily demand of the Virginia system.[3] The water intake system is located east and south of 2nd Street North, near Chestnut Street (Figure 5.2-4).

Figure 5.2-5. Design Schematic for the City of Virginia Water Intake [A]



[A] The spelling of Mesabi has varied over time. Variations of the Mesabi Pit name, including "Missabe," appear in historical documents.
Source: Minnesota Department of Health. "Virginia Gets an Upgrade." *Waterline*. Winter 1999-2000.

The Rouchleau Pit water is considered to be of very high quality. While it is designated as a surface water, very little surface runoff contributes to the overall water supply within the pit. The majority of water is contributed by groundwater from the surficial drift aquifer and the Biwabik Iron Formation Aquifer. The large volume of water in the pit and deep location of the VPU's water intake helps to minimize potential problems related to any contaminants introduced to the supply. However, MDH has determined the susceptibility of the Rouchleau Pit to be high because there are no practical means of preventing all potential contaminant releases into the surface water. A $6.2 million water treatment facility upgrade and renovation was completed in 2001. The system presently consists of settling, filtration, and chemical treatment systems and is classified by the MDH as a Class A facility, the highest water treatment system classification in Minnesota. According to the MDH, currently turbidity, iron, and manganese are a treatment focus for the water treatment facility in Virginia. According to current City monitoring of the pit water, the turbidity levels within the raw water from the pit are less than two milligrams per liter (mg/l) which requires no treatment, as stated in the US Environmental Protection Agency's (USEPA) Disinfectants and Disinfection Byproducts Rule (71 FR 388, January, 4, 2006; Vol. 71, No. 2). The physical plant has the appropriate water treatment equipment to treat increases in turbidity and suspended solids if they occur.

The 2003 MDH Source Water Assessment identifies potential sources of contamination to Virginia's water supply source (Rouchleau Pit). As described in the Source Water Assessment, contaminants of

[3] Virginia Public Utilities website (http://www.vpuc.com/departments.html, accessed September 19, 2014); Minnesota Department of Health. "Virginia Gets an Upgrade." *Waterline*. Winter 1999-2000. Available at http://www.health.state.mn.us/divs/eh/water/com/waterline/featurestories/virginia.html

greatest concern to the city water supply are manganese, molybdenum and other metals, arsenic, bromine, fluoride, oils, fuels, solvents, sedimentation, microorganisms, turbidity and those contaminants commonly associated with turbidity, and contaminants that may be associated with past mining activities in the vicinity of the Rouchleau Pit (Mesabi Pit).[4]

VPU's water supply system provides water to approximately 13,000 people and businesses in Virginia including Midway and portions of Mountain Iron. The VPU also uses this water supply for its power plant turbines and for maintaining ambient temperatures in Bailey and Silver Lakes, two waterbodies near downtown Virginia.

In 2003-2004, the Cities of Virginia, Eveleth, Gilbert, and Mountain Iron completed an interconnected water supply piping system among these cities for an emergency backup supply from the VPU. Part of this piping connection is located within the existing US 53 easement agreement area. The interconnection piping system within the project area is discussed in Section 5.1.

ArcelorMittal Mine Water Use

ArcelorMittal operates the Minorca Mine on the north side of Virginia. The mine operation also pumps water from the northeast end of the Rouchleau (Mesabi) Pit through a barge mounted pump system into the Enterprise Pit to provide potable and process water for their Minorca Mine operations. ArcelorMittal's permit #2008-0216 has a maximum pumping rate of 2,000 GPM and a minimum target elevation of 1,280 feet mean sea level (msl) so as not to interfere with Virginia's water supply (DNR correspondence, August 29, 2013). The pumping system can also divert water flow into the Sauntry Creek system to supplement flow to Bailey and Silver Lakes.

The mine transfers water from an intake at the far north end of the Rouchleau Pit to the southern end of the Enterprise Pit (just north of the Rouchleau Pit; see Figure 5.2-3). All of the water for the ArcelorMittal Mine operation is taken after it mixes with the Enterprise Pit water. The mine pumps water for both process and potable water from a barge-mounted pumping system at the north end of the Enterprise Pit. It is conveyed through an overland pipe to the plant. At the plant it is split into process water and potable water. The potable portion is treated prior to use in the plant; the process water is not treated.

Rouchleau Pit Characteristics and Features

Mine pits such as the Rouchleau Pit are dynamic hydrologic systems that are influenced by changes in mining activities. As mining in the Rouchleau Pit area declined in the 1980s, water levels in the pit began to rise with the elimination of mine dewatering systems. Water elevations in the pit fluctuated between 1,115 feet and 1,135 feet msl during the 1980s. Starting in the early 1990s, water elevation in the pit continued to rise. By 1997, water elevation in the pit was approximately 1,225 feet msl, and by 2009 the elevation peaked at 1,310 feet msl. Water levels in the pit have declined slowly since 2009, by approximately two to three feet per year. The October 2012 water elevation was estimated to be 1,302 feet msl (*Draft Source Water Protection: Virginia Public Water Supply System*, NTS, Inc., May 2013). The aerial photos shown in Figure 5.2-4 demonstrate the variation in water level, notably how the separation between the Mesabi and Rouchleau Pits becomes apparent at lower surface water elevations. While the exact reason for water elevation decline in recent years is uncertain, one explanation may be the current sources of discharge (city of Virginia and ArcelorMittal mine operations) exceed the rate of recharge from groundwater. The *Draft Source Water Protection* report found that if the pumping rate from the Rouchleau Pit exceeds 1,235 million gallons/year (2,350 GPM) in a typical precipitation/evaporation year, then the water level would decline.

In July 2013, MnDOT conducted a bathymetric survey of the Rouchleau Pit. This survey indicated a 500 foot wide submerged haul road embankment crossing the southern part of the pit (Alternative E-1A alignment), within five to 25 feet of the existing water surface. A number of areas adjacent to this submerged embankment drop off sharply to depths of over 300 feet (as shown in Figure 5.2-1). There are

[4] The spelling of Mesabi has varied over time. Variations of the Mesabi Pit name, including "Missabe," appear in historical documents. This document will use Mesabi throughout.

also three natural land bridges in the Rouchleau Pit, as shown in Figure 5.2-6, with elevations around 1,180 feet msl. If the water level decreased below approximately 1,180 feet msl, it would result in the creation of sub-pits.

5.2.3 Environmental Consequences

5.2.3.1 No Build Alternative (Easement Agreement Area Closed)

The No Build Alternative is located outside of the Inner Emergency Response Area identified by MDH. Therefore, there are no anticipated direct impacts to water quality or accessibility of the water supply for either Virginia or the ArcelorMittal Mine with this alternative.

5.2.3.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)

Under the Existing US 53 Alternative, existing roadways are left intact to retain the current operation of US 53. Therefore, no changes to water supply resources would result.

5.2.3.3 Alternative M-1

Alternative M-1 is located south of existing US Highway 53. This realignment would move the highway away from the Rouchleau Pit and the Inner Emergency Response Area. Based on the location of Alternative M-1, this alternative would not require the placement of fill within the Rouchleau Pit or have any run-off or the potential for spills to reach the Rouchleau Pit. No direct impacts to water quality or accessibility of the water supply are expected.

5.2.3.4 Alternative E-1A

Alternative E-1A would cross the Rouchleau Pit along an existing submerged haul road embankment via fill (RSS Option) or a bridge (Bridge Option).

RSS Option

A number of construction methods have been considered for constructing engineered fill across the Rouchleau Pit for the Alternative E-1A RSS Option, including drawing down the pit water level to work in the dry, construct in the wet condition, or create a cofferdam for localized dewatering (see descriptions of these three methods in Section 5.3.3.2). Construction in dry conditions (i.e., pit drawdown method) could require the Rouchleau Pit to be dewatered to an elevation of 1,275 feet, or 30 feet below the surface elevation of 1,305 (measured summer 2013). The potential effects of the dewatering on the Rouchleau Pit water level and discharge to potential receiving waterbodies for the dry fill scenario are discussed in Section 5.3. The effects related to the Rouchleau Pit as a source water are described below.

- Water Supply Quality

The proposed Alternative E-1A alignment is located within the Virginia Inner Emergency Response Area (Figure 5.2-2). The City's intake system is located approximately 0.8 miles north of the proposed Alternative E-1A alignment (see Figure 5.2-4) and the ArcelorMittal Mine intake is located approximately 1.5 miles north of the alignment. The potential quality impacts to the water supply source for a fill crossing (the RSS Option) are described below.

Turbidity is a potential concern for fill placement within the pit. This may be minimized by placing fill in the dry condition (pit water drawdown of up to 30 feet to expose submerged haul road embankment) and stabilizing the new road embankment with engineered reinforcement. If turbidity is temporarily increased beyond USEPA thresholds during construction of the embankment, as monitored by the City, the City would treat the turbidity in order to comply with the USEPA's Disinfectant and Disinfection Byproducts rule. However, localized turbidity from road construction could be effectively controlled with erosion

control best management practices (BMPs). The City has indicated to MnDOT (multiple conversations, 2013; see correspondence in Appendix G) that potential turbidity generated from project construction is not expected to be an issue at its intake, which is nearly a mile from the new alignment and nearly 200 feet deep. Similarly, turbidity has not been identified as a concern at the ArcelorMittal Mine intake given its distance from the alignment (see correspondence in Appendix G).

A clean source of fill would be used below normal water level to avoid potential contamination issues. Specifically, fill material from eastern Biwabik Iron Formation areas, which are known to be high in sulfide bearing rock, will not be used. Local soil/rock material excavated from the construction zone may be used for fill if shown to be low in sulfides. MnDOT will also follow its technical guidance for best management practices for handling taconite tailings in road aggregate (see Appendix I).

Any potential contaminant spills on the road RSS fill section, such as gasoline, oil, and antifreeze, would be collected within the storm sewer system on the road and conveyed to treatment ponds where they could be contained for cleanup; therefore, potential contaminants would not be directly discharged into the pit or other surface waters. Emergency spills would be cleaned up as identified in MnDOT's Emergency Spill Response Technical Memorandum (MnDOT, April 2011).

Stormwater runoff from the RSS fill section would be collected and conveyed to the west side of the Rouchleau Pit (see Section 5.3). No untreated stormwater runoff would directly enter the pit. Therefore, contaminants from road surface runoff (including de-icing and anti-icing compounds) would not be directed to the Rouchleau Pit. If incidental amounts of runoff entered the Rouchleau Pit in the area of Alternative E-1A, the distance (approximately 0.8 mile) and volume of water between the road and the intake and the difference in depth between the road (5 to 30 feet below water surface) and the intake (approximately 190 feet below water surface) would cause dilution of contaminants, resulting in no need to modify current water supply treatment. Similarly, stormwater has not been identified as a concern at the ArcelorMittal Mine intake given its distance from the alignment.

A number of additional stormwater features would be incorporated into the road design where feasible to provide additional opportunities for spill containment and stormwater treatment. Features such as ditch checks, small interconnected ponds, and sediment basins will be used in conjunction with treatment ponds.

Based on implementation of mitigation measures described in Section 5.2.4, no quality impacts to the Rouchleau Pit water supply source are anticipated for any of the construction methods being considered for the RSS Option.

- Accessibility

If the pit drawdown construction method was used for fill placement, lowering the water level in the Rouchleau Pit would have minimal effects on the water intake pumps that supply the VPU's water treatment plant. The submerged intake for the water pumps is at an elevation of 1,117 feet. With a 30 foot drawdown of the pit (for dry fill construction), the water surface elevation in the pit is projected to be 1,275 feet during the earliest part of construction of the embankment. This drawdown level is well above the minimum water elevation (1,123 feet) established for the pumphouse. However, it may change the head conditions under which the pumps operate, resulting in a minor reduction in pump capacity (drop from 2,000 GPM to 1,800 GPM). The reduced capacity of the pumps may require slightly longer pump run times and slightly decreased efficiency but should not affect the utility's ability to effectively treat and deliver water (HDR, 2014).

With regard to ArcelorMittal mining operations, the construction method requiring an approximately 30 foot drawdown of the Rouchleau Pit could result in impacts to the ArcelorMittal Mine intake pumps/barge at the north end of the Rouchleau (Mesabi) Pit (Figure 5.2-3). These pumps move Rouchleau Pit water to the adjacent Enterprise Pit for backup mine use. A water level drop of 30 feet could render this system inoperable without substantial elevation adjustments (HDR, 2014). The ArcelorMittal groundwater appropriations permit allows it to drawdown the Enterprise Pit to an elevation of 1,280 feet. If the adjacent Rouchleau Pit dewatering results in the Enterprise Pit level being temporarily below 1,280 feet, a permit modification may also be required for the mine. However, as described in Section 5.3, because

MnDOT needs to find acceptable receiving water locations for its dewatering, the dewatering system could provide the necessary volume of backup water that ArcelorMittal requires to maintain the water level in the Enterprise Pit and continue its mining operations, as well as to maintain the option to divert water into the Sauntry Creek system. MnDOT would detail the pumping rates to this receiving water in MnDOT's dewatering permit and coordinate an agreement with the mine operator. Additional information on dewatering options and their relationship to the ArcelorMittal intake can be found in the TH 53 Relocation Alternative E-1A RSS Construction Option Water Management Study (HDR, 2014; provided in Appendix G) and Section 5.3.

Bridge Option

- **Water Supply Quality**

The Alternative E-1A Bridge Option is located within the Virginia Inner Emergency Response Area (Figure 5.2-2). The City's intake system is located approximately 0.8 miles north of the proposed Alternative E-1A alignment (see Figure 5.2-4) and the ArcelorMittal Mine intake is located approximately 1.5 miles north of the alignment. The potential water supply source impacts for a bridge crossing are described below.

Turbidity is a potential concern for bridge construction but to a lesser degree (compared to use of embankment fill involved in the RSS Option) given fill/disturbance (excavation, pilings, etc.) would be limited to pier construction areas. If turbidity is increased beyond USEPA thresholds as a result of constructing the bridge, as monitored by the City, the City would treat the turbidity in order to comply with the USEPA's Disinfectant and Disinfection Byproducts rule. However, localized turbidity from pier construction could be effectively controlled with erosion control BMPs. Similarly, turbidity has not been identified as a concern at the ArcelorMittal Mine intake given its distance from the alignment (see correspondence in Appendix G).

Stormwater runoff from the bridge would be collected and conveyed to the west side of the pit. No untreated stormwater runoff would directly enter the pit. Therefore, contaminants from road/bridge surface runoff would not be directed to the Rouchleau Pit. If incidental amounts of runoff do enter the Rouchleau Pit in the area of Alternative E-1A, the distance (approximately 0.8 miles) and volume of water between the bridge and the intake and the depth of the intake (approximately 190 feet below water surface), dilution of contaminants would occur, resulting in no need to modify current water supply treatment. Similarly, stormwater runoff has not been identified as a concern at the ArcelorMittal Mine intake given its distance from the alignment.

Any potential contaminant spills on the bridge, such as gasoline, oil, and antifreeze, would be collected within the storm sewer system on the bridge and conveyed to a treatment pond where they could be contained for cleanup; therefore, no contaminants would discharge into the pit. Emergency spills would be cleaned up as identified in MnDOT's Emergency Spill Response Technical Memorandum (MnDOT, April 2011).

A clean source of fill would be used below normal water level to avoid potential contamination issues. Specifically, fill material from eastern Biwabik Iron Formation areas, which are known to be high in sulfide bearing rock, will not be used. Local soil/rock material excavated from the construction zone may be used for fill if shown to be low in sulfides. MnDOT will also follow its technical guidance for best management practices for handling taconite tailings in road aggregate (see Appendix I).

- **Accessibility**

This alternative would have no impacts to VPU's or ArcelorMittal's intake pumps.

Based on consideration of anticipated impacts and implementation of mitigation measures described in Section 5.2.4, no quality or accessibility impacts to the Rouchleau Pit water supply are anticipated for the Alternative E-1A Bridge Option.

Intersection and Interchange Options

These options are located outside the Rouchleau Pit and have no impacts to water supply.

5.2.3.5 Alternative E-2

Alternative E-2 would cross the Rouchleau Pit. The crossing method was determined to be a bridge based on the potential complications involved in constructing a fill section in this location (see discussion in Section 2.4.4). There would be no differences in impacts to the water supply resulting from the Interchange and Intersection Options or the Straight and Curved Setback Options given their location outside the pit.

- **Water Supply Quality**

The proposed Alternative E-2 alignment has potential to impact to the Virginia Inner Emergency Response Area (Figure 5.2-2). The City's intake system is located approximately 0.6 miles north of the proposed Alternative E-2 alignment (see Figure 5.2-4) and approximately 1.2 miles from ArcelorMittal's intake. The potential water supply source impacts for a bridge crossing for Alternative E-2 are described below.

Turbidity is a potential concern for bridge construction but at a lesser degree (compared to use of embankment fill) given fill/disturbance (excavation, pilings, etc.) would be limited to pier construction areas. If turbidity is increased beyond USEPA thresholds as a result of constructing the bridge, as monitored by the City, the City would treat the turbidity in order to comply with the USEPA's Disinfectant and Disinfection Byproducts rule. However, localized turbidity from pier construction could be effectively controlled with erosion control BMPs. Similarly, turbidity has not been identified as a concern at the ArcelorMittal Mine intake given its distance from the alignment (see correspondence in Appendix G).

Stormwater runoff from the bridge would be collected and conveyed to stormwater ponds. No untreated stormwater runoff would directly enter the pit. Therefore, contaminants from road/bridge surface runoff would not be directed to the Rouchleau Pit. If incidental amounts of runoff do enter the Rouchleau Pit in the area of Alternative E-2, the distance (approximately 0.6 miles) and volume of water between the bridge and the intake and the depth of the intake (approximately 190 feet below water surface), dilution of contaminants would occur, resulting in no need to modify current water supply treatment. Similarly, stormwater runoff has not been identified as a concern at the ArcelorMittal Mine intake given its distance from the alignment.

Any potential contaminant spills on the bridge, such as gasoline, oil, and antifreeze, would be collected within the storm sewer system on the bridge and conveyed to a treatment pond where they could be contained for cleanup; therefore, no contaminants would discharge into the pit. Emergency spills would be cleaned up as identified in MnDOT's Emergency Spill Response Technical Memorandum (MnDOT, April 2011).

A clean source of fill would be used below normal water level to avoid potential contamination issues. Specifically, fill material from eastern Biwabik Iron Formation areas, which are known to be high in sulfide bearing rock, will not be used. Local soil/rock material excavated from the construction zone may be used for fill if shown to be low in sulfides. MnDOT will also follow its technical guidance for best management practices for handling taconite tailings in road aggregate (see Appendix I).

- **Accessibility**

This alternative would have no impacts to VPU's or ArcelorMittal's intake pumps.

Based on consideration of anticipated impacts and implementation of mitigation measures described in Section 5.2.4, no quality or accessibility impacts to the Rouchleau Pit water supply are anticipated for this alternative.

Intersection, Interchange, Straight, and Curved Setback Options

These options are located outside the Rouchleau Pit and have no impacts to water supply.

5.2.4 Avoidance, Minimization, and Mitigation Measures

Alternatives E-1A and E-2 were identified as having potential for impacts to the Virginia water supply source water and potentially to the ArcelorMittal Mine appropriation supply due to the location of the alternatives in relation to the Rouchleau Pit.

5.2.4.1 Avoidance and Minimization

Alternatives E-1A (RSS Option and Bridge Option) and E-2: To avoid the potential for contamination impacts to the water supply, specifications for the source and nature of any fill (i.e., use of clean fill; use of mining by-products only if low in sulfides) used within the Inner Emergency Response Area would be required for project construction.

During construction, USEPA National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP) BMPs and other measures would be in place to avoid/minimize any potential stormwater runoff or erosion issues that would impact Virginia's water supply.

Alternative E-1A RSS Option: Measures that have been identified to minimize potential for water quality impacts include slope stabilization, stormwater collection, and a spill containment system.

To address potential drawdown impacts to the adjacent Enterprise Pit, water generated by dewatering (i.e., water pumped from the Rouchleau Pit during dewatering) would be provided to ArcelorMittal to maintain Enterprise Pit water level and eliminate the need for barge modifications. Coordination of appropriations permit modification would occur to allow for temporary water levels below 1,280 in the Enterprise Pit. These measures would be negotiated with the mine operator (ArcelorMittal) and the DNR if the drawdown method were selected. Additional information on dewatering methods can be found in the TH 53 Relocation Alternative E-1A RSS Construction Option Water Management Study (HDR, 2014; provided in Appendix G) and Section 5.3.

Alternatives E-1A Bridge Option and E-2: The proposed bridge crossing over the Rouchleau Pit would minimize potential water quality impacts by requiring negligible fill within the water. The option of constructing the crossing on a fill section was eliminated for Alternative E-2 due to cost and constructability concerns and the potential for water quality impacts with fill depth (up to 120 feet) and proximity to the City's intake wells (see Chapter 2: Alternatives).

5.2.4.2 Mitigation Measures

BMPs, as identified within the NPDES SWPPP, would be implemented by MnDOT to minimize the amount of turbidity generated by the project within the Rouchleau (Mesabi) Pit water supply. The City would continue to monitor for turbidity levels and, if thresholds are exceeded, would implement additional treatment to comply with the USEPA's Disinfectants and Disinfection Byproduct Rule (71 FR 388) (email from Mike Appelwick, dated 10/1/2012) (see Appendix G).

5.3 Waterbody Modification

NOTE TO READER: Water resource-related issues are discussed in a number of different sections in this chapter of the Draft EIS. To facilitate cross-referencing coverage of water resources issues, the summary of topics and Draft EIS sections in the call out box may be useful.

Water Resource-Related Sections:
- 5.2 Water Supply
- 5.3 Waterbody Modification
- 5.4 Wetlands
- 5.5 Surface Water Runoff: Quantity and Quality

The following evaluation of potential waterbody physical modifications within the study area is derived from several technical reports (including the Preliminary Geotechnical Engineering Report for TH 53 Relocation: E-1A Alignment – Embankment (Gale-Tec Engineering Inc., 2014), Preliminary Geotechnical Engineering Report for TH 53 Relocation: M-1 Foundations (Gale-Tec Engineering Inc., 2013), and TH 53 Relocation Alternative E-1A RSS Construction Option Water Management Study (HDR, 2014; provided in Appendix G)) and a

bathymetric survey (MnDOT, 2013) (depicted in Figure 5.2-1). These reports are incorporated herein by reference and available on the project website.[5]

5.3.1 Regulatory Context and Methodology

5.3.1.1 Regulatory Context

The US Army Corps of Engineers (USACE) regulates waters of the US under Section 404 of the Clean Water Act. Section 404 of the Clean Water Act established a program to regulate the discharge of dredged or fill material into waters of the United States, including those wetlands that are not isolated hydrologically on the landscape. The West Two Rivers Reservoir is a water of the US, which is being considered as a temporary receiving water for dewatering discharges under a construction method being considered for the Alternative E-1A RSS Option, as described in Section 5.3.2.

The DNR regulates physical modification of state designated public waters; however, no state public waters have been identified within the project study area. One state public waterbody, West Two Rivers Reservoir, is being considered as a temporary receiving waterbody for dewatering discharge. Water use, including transfers of water and dewatering for construction, are managed by the DNR through the water appropriation permit program.

The Minnesota Pollution Control Agency (MPCA) regulates the operation of wastewater disposal systems and the discharge of wastewater to receiving waters of the state through its NPDES/State Disposal System (SDS) water quality permitting program. It does not regulate transfers of water, as defined by federal law, from one waterbody to another that does not involve an intervening commercial or industrial use or the introduction of pollutants.

The Great Lakes-St. Lawrence River Basin Water Resources Compact (Great Lakes Compact) prohibits diversion of water from the Great Lakes Basin. The compact was adopted in 2005 and signed into law in 2008. Within five years of the compact adoption, a list of existing withdrawals, diversions, and consumptive uses were submitted by each state to establish a baseline for determining new or increased withdrawals, diversions, and consumptive uses. On the list submitted by the State of Minnesota was U.S. Steel Minntac Water Appropriation permit 1963-0846, which authorizes a volume of 24.1 million gallons per day (8.797 billion gallons per year) as part of the baseline diversions.

5.3.1.2 Methodology

For purposes of this evaluation, a waterbody is defined as an open surface water which does not qualify as a wetland (wetlands are covered in Section 5.4). Waterbodies within the study area were evaluated for potential physical impacts resulting from construction. Impacts were quantified based on the area of evaluation for each alternative as described at the beginning of this chapter (shown in Figures 2.1-5, 2.1-6, and 2.2-1). In addition, this section assesses the physical (hydraulic) and water quality impacts to potential receiving waters if temporary dewatering is required for construction of an alternative. For those alternatives, the volume of water appropriation required and the capacity of potential waterbodies to receive the discharge were evaluated.

The potential for water quality and accessibility impacts to the Rouchleau Pit water supply users is discussed in Section 5.2. Stormwater runoff impacts are discussed in Section 5.5.

5.3.2 Existing Conditions

The only waterbody identified in the area potentially affected by project construction is the Rouchleau Pit, which encompasses the Mesabi Mountain Mine Pit and several other pits and has developed into a contiguous waterbody. The Rouchleau Pit is groundwater fed and receives minor surface water runoff. The Rouchleau Pit does not have any public access, was not identified on the DNR's public waters inventory, and is not considered a DNR public water; however, for MPCA water quality permitting

[5] http://www.dot.state.mn.us/d1/projects/hwy53relocation/TechnicalReports.html

considerations, it is a water of the state as defined in Minnesota Statutes, section 115.01. It is not a water of the US for purposes of Section 404 of the Clean Water Act.

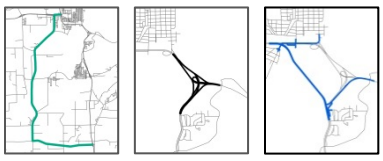
The water depth of the Rouchleau Pit is estimated to be at least 120 feet in the Alternative E-2 crossing location and over 300 feet adjacent to the Alternative E-1A crossing area. The submerged haul road embankment at Alternative E-1A has water depths of approximately five to 30 feet according to the bathymetric survey (MnDOT, 2013) (see Figure 5.2-1). See Section 5.2 for more information on the water level within the Rouchleau Pit. The pit itself is estimated to be an average of 300 feet deep with banks above the water line that exceed 130 feet on the west side and nearly 170 feet on the east side.

There are three waterbodies that are being considered as potential receiving waters for temporary construction dewatering under Alternative E-1A. Similar to the Rouchleau Pit, two of the waters (Enterprise Pit and Minntac Cell 2) do not have any public access, are not considered DNR public waters, and are not a water of the US for purposes of Section 404 of the Clean Water Act. However, for MPCA water quality permitting considerations, they are waters of the state as defined in Minnesota Statutes, section 115.01. The three waterbodies include:

- The Enterprise Pit: This pit is located just north of the Rouchleau Pit. It has no natural outlet and was once a mine pit that has filled in with groundwater. Water is pumped into the Enterprise Pit from the Rouchleau Pit via a barge-mounted pump station by ArcelorMittal. Water can also be diverted from the pipeline between the Rouchleau Pit and the Enterprise Pit to augment water levels in Sauntry Creek and Bailey/Silver Lakes. Water is pumped from the Enterprise Pit by ArcelorMittal for use at the Minorca taconite processing plant.
- West Two Rivers Reservoir: This basin is located approximately 5.5 miles west of the Rouchleau Pit. This reservoir outlets to West Two Rivers and is used by Minntac as an alternate source for process makeup water. There are two controlled outlets from the reservoir. One is a stoplog structure/sheetpile dam, which flows into West Two Rivers. The second is a siphon outlet through the primary earthen dam that provides a minimum flow of three cubic feet per second (cfs) into West Two Rivers to maintain/augment minimum flow. The siphon outlet was part of the 1963 water appropriation permit that authorized establishment of the reservoir.[6] West Two Rivers eventually flows to the St. Louis River. There are currently natural flows into the reservoir, including some of the dewatering flow from US Steel's Minntac East and West mine pits. This reservoir is a DNR public water (994P) and a water of the US.
- The US Steel Minntac Tailings Basin Cell 2: This basin is located approximately six miles northwest of the Rouchleau Pit. There is no surface outlet (i.e., discharge pipe or overflow) from the tailings basin although uncaptured seepage from the basin flows to the Dark River and Sand River systems. Water from the ore processing is discharged into the tailings basin. Minntac has one seepage capture system (and is developing a second), which routes seepage back into the tailings basin. Clear water (after settling) is re-circulated to the plant to be used as process water. It is essentially a semi-closed loop with evaporation and uncaptured seepage losses.

5.3.3 Environmental Consequences

5.3.3.1 No Build, Existing US 53, and M-1 Alternatives



These alternatives result in no new construction (No Build and Existing US 53 Alternatives) or are not located in proximity to the Rouchleau Pit (Alternative M-1) and therefore do not have any effect on the Rouchleau Pit waterbody.

[6] US Steel's Water Appropriation Permit issued in 1963 (Permit # 1963-0846) authorized (1) the establishment of the West Two Rivers Reservoir and (2) the appropriation of water from the reservoir to the Mountain Iron Pit and required a minimum three cfs be released from the reservoir at all times for stream augmentation.

5.3.3.2 Alternative E-1A

RSS Option

Crossing the Rouchleau Pit via an engineered fill section would separate the westernmost portion of the pit from the larger waterbody to the east, but the two sides would remain hydraulically connected due to porosity of the fill. Therefore, water levels on both sides of the new road are expected to rebound slowly and equalize after dewatering for construction has ceased.

There are three different construction methods that have been evaluated to construct the Alternative E-1A RSS Option (Gale-Tec Engineering, 2014), all of which would have approximately the same fill footprint (approximately 29 acres). Each method can and would be designed for stability with variable water level conditions during and after construction and would not limit future dewatering or mining operations within the existing permit to mine or environmental setting boundaries.

- Construct in the wet condition: With this method fill would be placed starting at one or both ends of the water crossing, pushing fill into the water until the road base is above the water line (30 feet). It would result in the greatest exposure of the waterbody to potential turbidity. It is also the least desirable from a stability perspective due to the added difficulty of achieving good compaction in an inundated environment and removing submerged trees and other organics from the submerged haul road.
- Create a cofferdam for localized dewatering: With this method a barrier would be placed around the construction area, and water from within the construction zone would be pumped out to create dry conditions. The removed water would be routed through a sediment basin and back into the Rouchleau Pit outside of the construction zone. The turbidity exposure potential is reduced to the period during construction of the cofferdam. The volume of water from dewatering would be approximately 135 million gallons for initial drawdown and 10,000 to 50,000 gallons per minute, depending on the permeability of the buried mine waste rock fill in the submerged haul road and the method chosen for sealing the bottom of the construction area to maintain conditions such that embankment construction could occur and compaction would be conducted in dry conditions. This dewatering would not result in any temporary or permanent modification to the current water level in the Rouchleau Pit.
- Drawing down the entire pit water level to work in the dry: If this construction method is used, a water level drop of 30 feet in the Rouchleau Pit (from an elevation of 1,305 feet (measured in 2013) to the top of the submerged haul road embankment at 1,275 feet) would be required, representing a total volume of approximately 2.65 billion gallons. To remove this volume of water in a three month window, dewatering would need to occur at a rate of 23,850 GPM or 34.3 MGD (adjusted to accommodate the additional groundwater inflow induced by the dewatering). Once an elevation of 1,275 feet is reached, maintenance pumping would occur at a rate of approximately 5,400 GPM during the remaining dewatering period to allow embankment construction/compaction to occur in dry conditions. This maintenance dewatering period is expected to be less than six months since dewatering could cease after the road fill reaches above 30 feet.

If one of the first two methods were used for construction of this alternative, the waterbody impact would essentially be limited to the footprint of the road fill (29 acres). There would be no temporary or permanent impacts to water levels in the pit.

If the pit drawdown approach were used for dry fill placement, pumped water would need to be conveyed to surface waters outside the immediate project area. Potential receiving waters were identified using aerial mapping data and with input from MnDOT, DNR, MPCA, the City of Virginia, VPU, ArcelorMittal, Cliffs Natural Resources, and US Steel. The TH 53 Relocation Alternative E-1A RSS Construction Option Water Management Study (HDR, 2014; provided in Appendix G) describes over a dozen potential receiving waters considered for the pit drawdown construction method to determine which were feasible.

In the Water Management Study, the receiving water options were analyzed for their capacity to receive the water volume and the potential water appropriations and water quality permit requirements. Many of the options for a water transfer were eliminated due to the high flow rate associated with the relatively short three month period allocated for the initial drawdown dewatering, which is dictated by the construction schedule. In addition, options where the proposed water transfer would impact an existing NPDES permit, requiring either a major modification or permit re-issuance, were eliminated from further study due to schedule constraints.

Another factor considered in the analysis was whether the receiving water options were waters of the state, as defined by federal law. If so, the transfer would then be between waters of the state and would not be subject to MPCA water quality permitting, provided that there is no intervening commercial or industrial use of the water and no pollutants are introduced during construction operations or transfer of the water. Any construction activities within the Rouchleau Pit would require coverage under the MPCA's construction stormwater permitting program. Conditions of the construction stormwater permit would preclude the introduction of construction-related pollutants to the water being transferred.

Based on the feasibility assessment in the Water Management Study (HDR, 2014; provided in Appendix G), two waterbodies (the West Two Rivers Reservoir and the US Steel Minntac Tailings Basin Cell 2) were identified as feasible options for receiving high-volume flows from the initial drawdown dewatering period, and one waterbody (the Enterprise Pit) was identified as a feasible option for the construction maintenance dewatering period. All three of the waterbodies were determined to have the capacity to receive the maintenance and/or initial drawdown dewatering discharges without adverse hydraulic impacts. The dewatering conveyance piping from the Rouchleau Pit to the receiving waters would be located to minimize environmental impacts, and the discharge outlet at the receiving water would be designed to minimize erosion/scour at the discharge point. For all three of the options, potential routes were identified that would have the least potential for environmental impacts (see Figure 5.3-1). The temporary, above-ground (except at road or railroad crossings) dewatering conveyance piping would be routed primarily within previously disturbed areas (road, railroad, utility corridors, and previously mined/graded areas). Three parallel 36-inch steel pipes would be placed on existing ground surface and remain in place for a minimum of six months. The waterbody characteristics and potential implications of receiving dewatering flows are described below, along with proposed temporary piping routing locations.

- The Enterprise Pit is located immediately north of Rouchleau Pit and is an intake source for the ArcelorMittal Mine water supply. This system does not have capacity to accommodate the initial drawdown volume but could accommodate the maintenance dewatering volume. A water transfer from the Rouchleau Pit to the Enterprise Pit as part of the dewatering scheme would mitigate the loss of operation of the existing ArcelorMittal pumping station in the Rouchleau Pit if water levels decreased below the intake elevation (see section 5.2.3.4). However, MnDOT may need to adjust or relocate the barge pumping system during the drawdown. Routing water to the Enterprise Pit would involve minimal infrastructure given its proximity to the Rouchleau Pit. In addition, some water could be diverted to Sauntry Creek, possibly using the existing diversion structure to supplement flow to Bailey and Silver Lakes. The Enterprise Pit has no natural outlet; it was once a mine pit that has filled in with groundwater. Water is currently pumped from the Enterprise Pit by ArcelorMittal for use at the Minorca mine.
    - Piping Route: Water could be pumped over the ridge between the Rouchleau and Enterprise Pits using ArcelorMittal's existing pipe and/or adding parallel pipes to accommodate the additional water volume (see Figure 5.3-1). No permanent resource impacts would occur from the installation of these temporary pipes. There would be temporary impacts to existing vegetation, which would be restored after the pipes are removed. For additional details, see Section 5.16.1.10.
- The West Two Rivers Reservoir is located approximately 5.5 miles west of Rouchleau Pit. This reservoir outlets to West Two Rivers and is used by US Steel as a source for process makeup water for its Minntac facility. Routing this water would require placement of aboveground piping (three 30-inch high density polyethylene (HDPE) pipes) placed primarily within existing road/railroad right-or-way

and other previously disturbed areas. The pipe would cross US 53 and other roads via existing culvert locations or would be bored under the roadways and railroad crossings when necessary. Where crossing wetlands or other undisturbed ground, the pipe would be placed on the surface and removed when dewatering is complete.

As noted in Section 5.3.2, there are two controlled outlets from the reservoir.

- Piping Route: The pipe to transfer Rouchleau Pit water to the West Two Rivers Reservoir would be pumped from the southwest end of the Rouchleau Pit, crossing under existing US 53 via existing bridges near 2nd Avenue to follow along the south US 53 right-of-way to US 169. Using the south right-of-way of US 169, the pipes would extend to the west to an existing power line corridor just north of the reservoir, then use the power line corridor to reach the reservoir (see Figure 5.3-1). No permanent resource impacts would occur from the installation of these temporary pipes. There would be temporary impacts to existing vegetation, which would be restored after the pipes are removed. For additional details, see Section 5.16.1.10.

- The US Steel Minntac Tailings Basin Cell 2 is located approximately six miles northwest of the Rouchleau Pit and can accommodate the initial drawdown volume. Routing this water would require placement of above ground piping (three 30-inch HDPE pipes) placed primarily within existing road/railroad right-or-way and other previously disturbed areas. The pipe would cross US 53 and other roads via existing culvert locations or would be bored under the roadways and railroad crossings when necessary. Where crossing wetlands or other undisturbed ground, the pipe would be placed on the surface and removed when dewatering is complete.

  As noted in Section 5.3.2, there is no surface outlet (i.e., pipe discharge or overflow) from the tailings basin.

  A transfer of water from the Rouchleau Pit to the Minntac Tailings Basin constitutes a transfer of water out of the Lake Superior Watershed and would normally require regional review and exemption through the Great Lakes Compact process. However, because water transferred out of the Lake Superior watershed by US Steel to its Minntac facility was identified as part of Minnesota's baseline diversion and is below the permitted total of 8.797 billion gallons per year, DNR officials have indicated that a transfer from the Rouchleau Pit to the Minntac Tailings Basin would be allowed under the current baseline diversion.

  Implementation of this option would require an administrative amendment to US Steel's existing water appropriation permit (1963-0846) to include the Rouchleau Pit as a water source. According to the DNR, a new appropriation permit would not be required. Once the state and federal environmental processes are concluded (i.e., state adequacy determination and federal Record of Decision), an administrative amendment could be pursued by US Steel.

  Rouchleau Pit water appears to be of better quality than that of the water within US Steel's Minntac Tailings Basin, based on a partial water quality characterization from November 2012. A more comprehensive water quality characterization would need to be conducted to ensure that there are no issues with other constituents contained in the Rouchleau Pit water prior to transfer to the Minntac Tailings Basin or other receiving waterbody. A transfer of water from the Rouchleau Pit to the Minntac Tailings Basin could potentially provide benefits to Minntac with respect to the management of water quality within their tailings basin and their long term goal of minimizing effects of uncaptured basin seepage on downstream waters. A comprehensive water quality evaluation and any required permitting would have to be completed prior to implementation of a water transfer from the Rouchleau Pit to the Minntac Tailings Basin.

  - Piping Route: The pipe to direct flows to the Minntac Tailings Basin would follow the west finger at the north end of the Rouchleau Pit along the top of the pit wall, go through the backyards of a few private parcels, follow road right-of-way (ArcelorMittal plant access roads) to a power line corridor or to US 53 right-of-way, move to railroad right-of-way for a short distance to cross US 53 under an existing railroad bridge, and then move back to an

overhead power line corridor (east option) or west along road corridors to US 53, following US 53 north to a power line corridor (west option). Where the power line meets the Minntac mine road, which follows the east side of the tailings basins, the pipe would follow the east side of the tailings basin perimeter dike road until it crosses under the road to the west near clear pool reservoir Cell 1. The pipe would then follow the edge of Cell 1 until it reaches the southeast corner of Cell 2 where the Rouchleau Pit water would enter the tailings basin clear pool reservoir system (see Figure 5.3-1). No permanent resource impacts would occur from the installation of these temporary pipes. There would be temporary impacts to existing vegetation, which would be restored after the pipes are removed. For additional details, see Section 5.16.1.10.

These options have been reviewed by the DNR and MPCA, and these agencies have indicated that all three options could potentially provide short-term water quality improvements to these receiving waters.

Construction impacts to install and remove the temporary piping for the dewatering options are addressed in Section 5.16.

Bridge Option

The Alternative E-1A Bridge Option would cross the Rouchleau Pit by bridge, minimizing the impact to the waterbody by avoiding most activity below the water line. Disturbance (excavation, pilings, etc.) within the waterbody would be limited to construction of bridge piers and abutments. Pier and abutment locations would be designed to minimize impacts (localized fill) on the waterbody to the extent feasible. Only localized, temporary dewatering would be required during pier/abutment construction. Water from temporary construction dewatering would be routed through a sediment basin and back into the Rouchleau Pit.

Interchange and Intersection Options

There would be no differences in impacts to the Rouchleau Pit resulting from the Interchange and Intersection Options given their location outside the pit.

5.3.3.3 Alternative E-2

Alternative E-2 would cross the Rouchleau Pit by bridge, minimizing the impact to the waterbody by avoiding most activity below the water line. Disturbance (excavation, pilings, etc.) within the waterbody would be limited to construction of bridge piers and abutments. Pier and abutment locations would be designed to minimize impacts (localized fill) on the pit and waterbody to the extent feasible. Only localized, temporary dewatering would be required during pier/abutment construction. Water from temporary construction dewatering would be routed through a sediment basin and back into the Rouchleau Pit.

There would be no differences in impacts to the Rouchleau Pit resulting from the Interchange and Intersection Options or the Straight and Curved Setback Options given their location outside the pit.

5.3.4 Avoidance, Minimization, and Mitigation Measures

5.3.4.1 Avoidance and Minimization

Physical (fill) impacts to the Rouchleau Pit would be minimized to the extent possible, depending on the alternative selected. A number of construction methods are being considered to construct the Alternative E-1A RSS Option. If the pit drawdown dewatering method were used for the RSS Option, the receiving water impacts would be minimized through standard BMPs for pumped water. Measures would be implemented within the receiving waters to avoid erosion from increased flows. The alignment of the temporary piping system has been designed to avoid significant resources by following existing disturbed corridors (roads, rails, utility corridors) and would not require grading except where road crossings are needed.

5.3.4.2 Mitigation Measures

Water use, including transfers of water and dewatering for construction, are managed by the DNR through the water appropriation permit program. The DNR can include conditions in the permit requirements, if deemed necessary, to minimize and/or mitigate potential impacts. The DNR is authorized to issue long-term appropriation permits for individual uses that exceed daily and annual use volumes and has a General Permit (1997-0005) which authorizes temporary appropriations including dewatering for construction activities. If a water use meets the requirements for an Individual Appropriation Permit (i.e., if volumes exceed the General Permit conditions), an application must be completed for review by DNR. Minnesota Statutes allow local units of government 30 days to review appropriation permit applications.

A transfer of water from the Rouchleau Pit to accommodate construction of the Alternative E-1A RSS Option would require a new DNR Individual Appropriation Permit, a temporary construction dewatering permit, or a modification to an existing DNR water appropriation permit, depending on the receiving water as described below.

- Enterprise Pit: A temporary DNR water appropriation permit would be required for transferring water from the Rouchleau Pit to the Enterprise Pit. New individual permits and construction dewatering permits would be applied for by MnDOT.
- West Two Rivers Reservoir: A transfer of water from the Rouchleau Pit to the West Two Rivers Reservoir may require a new DNR water appropriation permit. For water transfers only (no fill or discharge of dredged material), a USACE permit would not be required.
- US Steel Minntac Tailings Basin Cell 2: An inter-basin transfer from the Rouchleau Pit to the Minntac Tailings Basin Cell 2 may require an administrative amendment to the existing US Steel Minntac appropriation permit (1963-0846) to include the Rouchleau Pit as a water source. A new appropriation permit would not be required. Once the state and federal environmental processes are concluded (i.e., state adequacy determination and federal Record of Decision), an administrative amendment could be pursued by US Steel.

  In addition, the transfer may require water-quality based discharge permitting from the MPCA depending on a number of factors, including whether the body of water receiving the transfer is part of an existing NPDES/SDS permit or whether there is an intervening use of the water or pollutants are added during the transfer. Generally, however, the water quality of the Rouchleau Pit is good, and water quality concerns are not anticipated if dewatering/water transfer is proposed for construction of project alternatives. US Steel's Minntac Tailings Basin Cell 2 is part of an existing NPDES/SDS permit (Permit Number MN0057207) so a transfer of water to it would require an administrative amendment to this NPDES/SDS to implement this option.

The Enterprise Pit and the West Two Rivers Reservoir are not part of existing NPDES/SDS permits and could receive a water transfer without specific NPDES/SDS permitting action. MnDOT conducted water quality sampling of the Rouchleau Pit in the spring of 2014 to document current conditions.

More specific information regarding anticipated permit requirements and mitigation will be provided in the Final EIS for the preferred alternative.

5.4 Wetlands

NOTE TO READER: Water resource-related issues are discussed in a number of different sections in this chapter of the Draft EIS. To facilitate cross-referencing coverage of water resources issues, the summary of topics and Draft EIS sections in the call out box may be useful.

Water Resource-Related Sections:
5.2 Water Supply
5.3 Waterbody Modification
5.4 Wetlands
5.5 Surface Water Runoff: Quantity and Quality

The following evaluation of potential wetland impacts within the study area is derived from the Water Resources Technical Report (Kimley-Horn, 2013), incorporated herein by reference

and available in Appendix J.

5.4.1 Regulatory Context and Methodology

5.4.1.1 Regulatory Context

The following agencies are involved in the review of environmental documents and, in some cases, the permitting or approval of impacts to wetland resources:

- USACE with review by USEPA
- MPCA
- MnDOT under the Wetland Conservation Act (WCA) with review entities including Board of Water and Soil Resources (BWSR), County Soil and Water Conservation District (SWCD), and DNR

MnDOT, the Federal Highway Administration (FHWA), USEPA, and USACE have entered into the National Environmental Policy Act (NEPA)/Section 404 merger process for this project. Specific information pertaining to the merger process can be found in Chapter 8: Consultation and Coordination. Specific jurisdictions and regulatory and review tasks of these agencies are described in the Water Resources Technical Report (Kimley-Horn, 2013; provided in Appendix J).

5.4.1.2 Methodology

The study area for wetlands included land adjacent to the project alternatives, generally extending out 500 feet or more. The areas of evaluation were defined for each alternative as described at the beginning of this chapter and are reflected in Figure 5.4-1.

Wetland impacts were evaluated based on the assumption that everything within the areas of evaluation (for the No Build, Existing US 53, and M-1 Alternatives) or the representative corridors within the widened areas of evaluation (for Alternatives E-1A and E-2) would be impacted by the project. This approach addressed potential worst-case impacts and allows for the impacts to be reduced as the project layout is refined. As described in Chapter 2: Alternatives, the widened area of evaluation over the Rouchleau Pit was determined to have similar wetland impacts regardless of where the ultimate road alignment is placed within the widened area. This conclusion was based on the location of Wetlands 40, 41, and 42, which cannot be avoided (see Figure 5.4-1), and lack of wetlands throughout the rest of the widened area.

The wetlands were identified based on a Level 1 assessment that utilized current digital data from the US Geological Survey (USGS), US Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), DNR Public Waters Inventory (PWI), and US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) hydric soils data. Wetland boundaries were verified by photointerpretation, review of digital data, and a field review of wetland areas for general wetland types and characteristics conducted on June 20-21, 2012. During the field review, approximately 90 percent of the wetland areas were evaluated in the field to determine the dominant plant community/wetland type and extent of the wetland boundaries. The field-reviewed wetlands were then used as a baseline for photointerpretation to confirm wetland boundaries and types for wetland areas where access was more difficult due to terrain or heavy cover. For inaccessible areas, topographic data from the Minnesota Geospatial Information Office (two foot contours) was used to estimate wetland boundaries.

Each wetland identified was given a unique identification number, and the total basin size was estimated. Each wetland was also assigned a value rating of exceptional, high, medium, or low quality, based on a qualitative assessment of diversity and integrity of the plant community using USACE's *Wetland Plants and Plant Communities of Minnesota and Wisconsin* (Eggers and Reed, 1997). Wetlands were also categorized into one of five plant communities as described by Eggers and Reed, including shallow marsh (SM), wet meadow (WM), sedge meadow (SME), shrub-carr (SC), and seasonally flooded basin (SF).

A Level 1 wetland delineation has been completed to date. A routine Level 2 delineation, using the methods outlined in the USACE 1987 Wetland Delineation Manual and Regional Supplement, will be conducted for the preferred alternative (May 2015), and updated wetland impact information will be

provided in the Final EIS. Due to the unique construction schedule required for this project, a jurisdictional determination for each of the wetland areas will be made by USACE based on the Level 1 delineation and updated as needed after the Level 2 delineation is complete. Similarly, the MnDOT Office of Environmental Services (OES), as the local government unit implementing the Wetland Conservation Act, will make a determination of which wetlands are covered by state law and updated as new information is obtained. For the purposes of this Draft EIS, it is assumed that all identified wetland areas, including those that may have been disturbed or created as a result of prior mining or grading activities, would be regulated by the state and the USACE if impacted. The Final EIS will provide any new jurisdiction information available at that time.

5.4.2 Existing Conditions

A total of 46 wetlands were identified within the study areas of the five alternatives. All wetlands identified are of medium to low quality due to disturbance from past mining and other human activities. Table 5.4-1 provides a summary of the wetlands identified along with their respective wetland types and estimated quality.

5.4.3 Environmental Consequences

Table 5.4-1 also provides a summary of the wetland impacts that would occur within the area of evaluation. These impacts are described by alternative below.

5.4.3.1 No Build Alternative (Easement Agreement Area Closed)

The No Build Alternative does not involve any new construction and therefore would not impact any wetlands.

5.4.3.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)

Under the Existing US 53 Alternative, the existing US 53 roadway is left intact to retain the current operation. No direct or indirect impacts to wetlands within or outside the existing right-of-way would occur.

5.4.3.3 Alternative M-1

Alternative M-1 is located south of existing US 53. This realignment would have the potential to impact wetlands on the north side of the existing Auburn Pit. Seven wetlands would potentially be graded or filled with a total impact of up to 8.8 acres.

Construction phase impacts to wetlands would result from Alternative M-1. Temporary impacts may result from equipment access required to build the roadway and structures. However, these temporary impacts would occur entirely within the area of evaluation and therefore are not expected to be greater than those defined above. Grading and soil disturbance during construction would be mitigated through implementation of BMPs for erosion control.

5.4.3.4 Alternative E-1A

Alternative E-1A is located north of existing US 53. For both the RSS and Bridge Options, this realignment would have the potential to impact 17 wetlands with a total impact of up to approximately 10.2 acres for the Intersection Option and 10.5 acres for the Interchange Option.

Construction phase impacts to wetlands would result from Alternative E-1A. Temporary

impacts may result from equipment access required to build the roadway and structures. However, these temporary impacts would occur entirely within the area of evaluation and therefore are not expected to be greater than those defined above. Grading and soil disturbance during construction would be mitigated through implementation of BMPs for erosion control.

5.4.3.5 Alternative E-2

Alternative E-2 is located north of existing US 53. This realignment would have the potential to impact 15 wetlands with a total impact of approximately 5.9 acres for the Intersection Option and 6.6 acres for the Interchange Option.

Construction phase impacts to wetlands would result from Alternative E-2. Temporary impacts may result from equipment access required to build the roadway and structures. However, these temporary impacts would occur entirely within the area of evaluation and therefore are not expected to be greater than those defined above. Grading and soil disturbance during construction would be mitigated through implementation of BMPs for erosion control.

Table 5.4-1 Wetland Impacts by Alternative

ID	Type[A]	Quality	Area (acres)	Acres Impacted[B]			
				M-1	E-1A	E-2	No Build and Existing US 53
1	SM (Type 3)	Low	0.3	0	0	0	0
2	WM/SC (Type 2/6)	Medium	14.4	6.9	0	0	0
3	SF (Type 1)	Low	0.4	0.4	0	0	0
4	SF (Type 1)	Low	0.5	0.1	0	0	0
5	SF (Type 1)	Low	0.4	0.04	0	0	0
6	SM (Type 3)	Low	0.1	0	0	0	0
7	WM/SC (Type 2/6)	Medium	1.3	0	0	0	0
8	WM/SC (Type 2/6)	Medium	1.1	0	0	0	0
9	WM (Type 2)	Medium	0.2	0	0	0	0
10	WM/SC (Type 2/6)	Medium	3.7	0.08	0	0	0
11	WM (Type 2)	Low	3.7	0	1.9	0	0
12	WM/SM (Type 2/3)	Low	1.0	0	1.0	1.0	0
13	WM/SC/SF (Type 2/6/1)	Medium	5.3	1.08	1.0	1.4	0
14	WM (Type 2)	Low	0.3	0	0	0	0
15	WM (Type 2)	Low	0.6	0	0.04	0	0
16	WM/SC (Type 2/6)	Medium	6.4	0	0.06	0	0
17	SM/WM (Type 3/2)	Low	1.1	0	0	0	0
18	WM (Type 2)	Low	2.5	0	0	0	0
19	SM/SME (Type 3/2)	Medium	3.5	0	0	0	0
20	SM/SME (Type 3/2)	Medium	11.3	0	0	0	0
21	WM (Type 2)	Low	0.1	0	0	0	0
22	SM (Type 3)	Medium	0.7	0	0	0.08	0
23	SME/SC (Type 2/6)	Medium	0.7	0	0.7	0.3	0
24	SM/SME (Type 3/2)	Medium	3.4	0	0.4	1.9	0
25	WM (Type 2)	Low	0.4	0	0	0.3	0
26	WM (Type 2)	Low	1.0	0	0.2	0.9	0
27	SM/SME (Type 3/2)	Medium	6.2	0	0.3	0	0
28	WM (Type 2)	Low	0.1	0	0.03	0.02	0
29	SME (Type 2)	Low	0.4	0	0.3	0.03	0
30	SF (Type 1)	Low	0.2	0	0.2	0.09	0

ID	Type[A]	Quality	Area (acres)	Acres Impacted[B]			
				M-1	E-1A	E-2	No Build and Existing US 53
31	SM (Type 3)	Low	0.3	0	0.3	0.05	0
32	SM/SME (Type 3/2)	Medium	11.8	0	2.3	0.3	0
33	WM (Type 2)	Low	0.9	0	0	0	0
34	SME/SC (Type 2/6)	Medium	0.3	0	0	0	0
35	SME/SC (Type 2/6)	Medium	0.2	0	0	0	0
36	SME/SC (Type 2/6)	Medium	15.4	0	0	0	0
37	OPEN WATER	Man-made	1.1	0	0	0	0
38	SM/SME/SC (Type 3/2/6)	Medium	1.5	0	0	0	0
39	SF (Type 1)	Low	0.1	0	0	0	0
40	SME/SC (Type 2/6)	Medium	2.0	0	1.8	0	0
41	SME (Type 2)	Medium	0.1	0	0.03	0	0
42	SM (Type 3)	Low	0.1	0	0.05	0	0
43	WM (Type 2)	Low	0.5	0	0	0.2	0
44	WM (Type 2)	Low	0.3	0	0	0.07	0
45	SC/WM (Type 6/2)	Low	0.2	0	0	0.01	0
46	WM (Type 2)	Low	1.3	0.2	0	0	0
		Total	**107.4**	**8.8**	**10.5**	**6.6**	**0**

[A] Shallow Marsh (SM), Wet Meadow (WM), Sedge Meadow (SME), Shrub-Carr (SC), and Seasonally Flooded Basin (SF)
[B] For Alternatives E-1A and E-2, the impact area was calculated based on representative corridors averaging 200-400 feet wide and 150-300 feet wide, respectively.

The impacts shown in the table for Alternatives E-1A and E-2 are for the Interchange Options. The Intersection Options result in 0.3 and 0.7 acres less impact for Alternatives E-1A and E-2, respectively. For Alternative E-2, the Straight Option is represented in the table. The Curved Setback Option would result in 2.4 acres of additional wetland impact, primarily to Wetland 32.

5.4.4 Mitigation Measures

5.4.4.1 Permits and Approval Requirements

Permits from the USACE (Section 404) and MPCA (Section 401 certification) will be required as part of this project. An Individual Permit is typically required for road projects with over five acres of wetland impact. Additionally, MnDOT, as the designated Local Governmental Unit (LGU), will issue a WCA wetland replacement plan approval for this project. All of these permits and approvals require documentation of sequencing, which is the evaluation of options for wetland avoidance, minimization, and mitigation.

5.4.4.2 Avoidance and Minimization

Efforts have been made during alternatives development and preliminary engineering of the various alternatives to minimize wetland fill impacts to the extent possible by following previously disturbed areas (roads, mined lands). Wetland impacts have largely been avoided as part of the Scoping process; by eliminating the West Corridor alternatives from further consideration, dozens of acres of wetland impact have been avoided. A constrained cross section was assumed in some locations for the Build Alternatives to avoid various resources impacts, resulting in some additional wetland avoidance.

Wetland impacts for the Build Alternatives may be further minimized by refining the project layout. A Level 2 wetland delineation will be conducted for the preferred alternative along with a jurisdictional determination by the USACE to determine the total wetland impact for the project. Updated wetland impact information will be provided in the Final EIS for the preferred alternative, determined through further coordination with the USACE and USEPA as part of the Section 404 merger process.

5.4.4.3 Mitigation Measures

All previously mentioned permits and approvals require some amount of mitigation (i.e., wetland replacement).

As described in the previous section, measures to further minimize wetland impacts will be considered as the conceptual layout is refined. However, it is not possible to avoid all wetland areas given the size and location of wetland areas and other constraints required to design the new road alignments; therefore, some level of wetland mitigation would be required.

The current minimum wetland replacement ratio for wetland credits is 1:1 for WCA regulated impacts and 1:1 for USACE regulated impacts on MnDOT road projects in the northeast part of the state if replacement is in the same Bank Service Area (BSA) as the impact and 1.5:1 if replaced outside the BSA. Discussions between MnDOT and the USACE have determined that the potential for wetland restoration is limited in the northeast and adjacent to the roadway corridor (bedrock, pit, mine dewatering); therefore, wetland replacement will likely be through use of wetland bank credits. The actual ratio applied will be determined through continued coordination with the USACE and other wetland review agencies.

MnDOT has established wetland bank credits that could potentially be used for this project's wetland mitigation requirement. MnDOT also has an agreement with BWSR regarding the creation of wetland mitigation banking sites. USACE has approved these existing MnDOT bank sites. Currently (as of December 2014), MnDOT does not have any mitigation banking sites available in northeastern Minnesota near the project area (Wetland Bank Service Areas 1, 2, and 5);[7] however, MnDOT has approximately 280 acres of wetland mitigation bank credits available throughout the rest of the state.[8] For purposes of this report, the nearest MnDOT wetland bank site with available wetland bank credit would be used to fulfill the wetland mitigation requirements for this project.

MnDOT also has access to (i.e., has purchased) established wetland credits in the BWSR Road Bank; however, there are virtually no USACE approved wetland credits in the impact BSA as of December 2014. The BWSR Road Bank does contain several hundred USACE-approved wetland credits in the adjacent BSAs (BSA 5 and BSA 6). At the time of permitting, it is MnDOT's intent to use the closest appropriate USACE-approved wetland credits in the BWSR Road Bank if credits are used for the wetland mitigation requirement.

The feasibility of creating on-site or project-specific mitigation for the project's wetland impact will be investigated. Areas where wetland creation would be considered include areas where existing four-lane roadway would be converted to two-lane and excess existing right-of-way is present. The average MnDOT cost for creating wetland mitigation credits is estimated at approximately $10,000 per acre of credit. Due to the previously disturbed nature of the project area, cost, mineral rights, and project timing, on-site mitigation may not be the most efficient or preferred method for replacement by the permitting agencies.

[7] Map available on the BWSR website at http://www.bwsr.state.mn.us/wetlands/CBSA_WS_Cnty.pdf

[8] Sarma Straumanis, Wetland Banking Specialist, MnDOT Office of Environmental Stewardship (personal communication, December 2014).

5.5 Surface Water/Water Quantity and Quality

NOTE TO READER: Water resource-related issues are discussed in a number of different sections in this chapter of the Draft EIS. To facilitate cross-referencing coverage of water resources issues, the summary of topics and Draft EIS sections in the call out box may be useful.

Water Resource-Related Sections:
5.2 Water Supply
5.3 Waterbody Modification
5.4 Wetlands
5.5 Surface Water Runoff: Quantity and Quality

5.5.1 Regulatory Context and Methodology

5.5.1.1 Regulatory Context

The MPCA administers the NPDES Construction Stormwater Permit program in Minnesota (Minnesota Statutes, sections 115 and 116; Minnesota Rules, parts 7001 and 7090). The NPDES permit program requires creation of a project/site-specific SWPPP. The SWPPP is intended to detail the installation, inspection, and maintenance of the erosion prevention and sediment control BMPs that would be utilized before and during construction to comply with state and local water quality requirements. The NPDES permit also requires permanent stormwater management BMPs at sites where construction activity results in a net increase of more than one acre of impervious area.

Section 303(d) of the Clean Water Act requires states to assess all waters to determine if they meet water quality standards and conduct total maximum daily load (TMDL) studies in order to set pollutant reduction goals. Areas of the project with outlets within one mile of and that flow to MPCA-designated impaired or special waters must incorporate additional BMPs, including a stricter stormwater treatment requirement. Impaired waters within one mile of the study area have been identified; however, none of these waters would be stormwater receiving waters for this project.

MPCA NPDES wet sedimentation basin BMP requirements for non-impaired waters include the following:

- The basin must have a permanent volume of 1,800 cubic feet of storage below the outlet pipe for each acre that drains to the basin or one inch of runoff from the new impervious surface created by the project, whichever is larger
- The basin's permanent volume must reach a minimum depth of three feet and be no more than 10 feet deep. The basin must be configured such that scour or re-suspension of solids is minimized.
- Basin outlets shall be designed such that the water quality volume is discharged at no more than 5.66 cubic feet per second (cfs) per acre of pond surface area
- Slopes no steeper than 1:3 above the normal water level, a 10-foot wide bench at slope 1:10 immediately above the normal water level, a 10-foot wide safety bench at slope 1:10 immediately below the normal water level, and slopes no steeper than 1:3 extending to the bottom of the pond

5.5.1.2 Methodology

An analysis of the existing and proposed impervious areas was completed to determine a net increase or decrease of impervious area for each alternative. Existing impervious areas were generated using existing topographic information provided by MnDOT. The proposed impervious areas for Alternatives M-1 and E-2 were generated from the conceptual roadway layouts dated September 10, 2012 and for Alternative E-1A from a conceptual roadway layout dated October 30, 2013.

The study area for stormwater was defined as the area of evaluation for each alternative as described at the beginning of this chapter (and shown in Figures 2.1-5, 2.1-6, and 2.2-1) and the surface receiving waters located adjacent to the project.

The extent of the study area for impaired waters, based on state regulation, includes impaired waters that are located within one mile of the project which would also receive stormwater discharges from the project.

Detailed drainage plans for the Draft EIS alternatives were not available for this analysis. Therefore, this analysis was based on the calculated change to impervious surface. This was then used to develop a rough estimate of stormwater runoff, calculated for each alternative to estimate the approximate sizing of needed stormwater ponds or treatment areas. With an overall reduction in impervious surface expected with the amount of road surface removed from the existing easement agreement area and excess right-or-way that could be used for drainage needs, this qualitative analysis provides an adequate measure of potential impact and mitigation that may be needed.

5.5.2 Existing Conditions

The existing drainage patterns of the study area show surface water from the surrounding area flowing primarily towards Manganika Creek. Runoff is collected and conveyed through a series of wetlands, ditches, and culverts to generally avoid direct discharge into the Auburn and Rouchleau Pits. Stormwater flows along the north side of the existing US 53 alignment toward the 2nd Avenue interchange where it is then conveyed through a series of culverts and ditches to the west into Manganika Lake. Some of the stormwater runoff from east of the Rouchleau Pit along Landfill Road is diverted into the Minnewas Pit (see Figure 5.1-1). This diversion was constructed to utilize existing storage and prevent flooding of the Southside Park and adjacent areas.

Silver Lake and Bailey Lake (identified on the DNR's Public Waters Inventory as Virginia Lake) are identified on the Minnesota Impaired Waters List due to high levels of mercury in fish. These waters are within one mile of the project but are outside the study area for the No Build, Existing US 53, and Build Alternatives.

The only named surface water in the study area of the Build Alternatives is the waterbody that has developed in the Mesabi/Rouchleau Pits (also described in Section 5.2). This groundwater-fed, man-made waterbody does not have any public access and is not identified as a DNR public water. The City of Virginia pumps potable water from the north end of this waterbody.

The existing easement agreement area roadways have an estimated impervious surface area of 21 acres.

5.5.3 Environmental Consequences

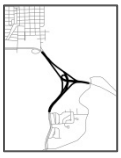
The calculated amount of existing impervious area varied slightly among alternatives as it included both the roadway within the existing easement agreement area plus parts of Landfill Road and US 53 outside of the existing easement agreement area based on the alternative alignments.

Under all alternatives, the stormwater drainageway east of the Rouchleau Pit and north of the Midway area that flows parallel to and along the north side of US 53 would remain after MnDOT vacates the existing easement agreement area. See Chapter 7: Cumulative Impacts regarding cumulative stormwater impacts due to mining operations.

5.5.3.1 No Build Alternative (Easement Agreement Area Closed)

There would be a reduction in the amount of impervious surface in the existing easement agreement area where US 53 is removed. Twelve acres of US 53 existing pavement would remain primarily between Midway and MN 135.

5.5.3.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)



There would be no change in impervious surface in the area or to the storm sewer system. No water quality impacts are anticipated.

5.5.3.3 Alternative M-1

Alternative M-1 applies two typical sections along the alignment. The rural typical section is proposed where possible which directs runoff from the roadway into grassed swales located within the approximately 40 foot center median and on each side of the roadway. A constrained cross section is assumed for the alignment through the Auburn Pit. Stormwater runoff would be collected and conveyed within a storm sewer system for this segment.

The Alternative M-1 alignment would have a net decrease in impervious surface area (approximately 11 acres) within the study area (more pavement removed from existing roadway than added with new alignment). Per NPDES requirements, treatment of stormwater would not be required based on the net decrease in impervious surface area for the project. However, the runoff from the road section that passes through the active mine pit must be managed to avoid impact to mine dewatering operations.

The stormwater features would be designed to meet the requirements of the NPDES permit for water quality treatment for the constrained cross section through the Auburn Pit. Per NPDES requirements, a permanent volume of approximately 0.8 acre-feet would be required for this segment of Alternative M-1. The size of the stormwater pond(s) would be approximately 0.3 acres in surface area and may be located in the areas shown in Figure 5.5-1. The discharge of the new pond(s) would be directed away from the existing Auburn Pit to avoid MnDOT having to purchase additional land for drainage easements. Discharge would be routed to the channel (Manganika Creek) on the west side of the Auburn Pit that ultimately drains to Manganika Lake (Figure 5.1-1). Per NPDES requirements, discharge may be limited to 5.66 cfs per acre of pond surface area for the water quality storm event.

Construction activities for Alternative M-1 would be consistent with typical roadway construction. Erosion and sediment control would be provided during construction in accordance with the requirements of the MPCA and NPDES.

5.5.3.4 Alternative E-1A

Alternative E-1A (RSS Option and Bridge Option) applies the same two typical sections along the alignment as Alternative M-1. The rural typical section was proposed where possible which directs runoff from the roadway into grassed swales located within the approximately 40-foot center median and on each side of the roadway. The constrained cross section was assumed for the alignment crossing through the Rouchleau Pit. Stormwater runoff would be collected and conveyed within a storm sewer system for this segment to direct it away from the Rouchleau Pit. The RSS Option would require pumping stormwater from the low point of fill to west side of pit, whereas the Bridge Option would gravity drain to the west side of the pit.

The Alternative E-1A Intersection Option would decrease the impervious surface area by approximately four acres within the study area, and the Interchange Option would decrease the impervious surface area by less than 0.5 acres. Per NPDES requirements, treatment of stormwater is not required based on the net change in impervious surface area for the project. However, water quality treatment of the stormwater runoff from the constrained cross section would be included to maintain water quality of the Rouchleau Pit (Virginia's water supply).

The wet detention ponds would be designed to meet the requirements of the NPDES permit for water quality treatment for the constrained cross section. For this segment of the alignment, per NPDES requirements, a permanent volume of approximately 1.0 acre-feet would be required. The size of the stormwater pond(s) would be approximately 0.4 acres in surface area. The discharge of the new pond(s) would be directed away from the Rouchleau Pit. Discharge would be routed to the channel (Manganika Creek) on the west side of the Auburn Pit that ultimately drains to Manganika Lake (Figure 5.1-1). Potential stormwater treatment pond locations are shown in Figure 5.5-2 and are all within existing or proposed right-of-way limits. Per NPDES requirements, discharge may be limited to 5.66 cfs per acre of pond surface area for the water quality storm event.

Construction activities for Alternative E-1A would be consistent with typical roadway construction with the addition of either crossing the Rouchleau Pit on a submerged haul road embankment (RSS Option) or a

bridge (Bridge Option). Erosion and sediment control would be provided during construction in accordance with requirements of the MPCA and NPDES.

MnDOT's current design and maintenance practices include many BMPs, such as installing stormwater ponds, using Road Weather Information Systems, calibrating sanders for road-clearing operations, and removing snow buildup along shoulders throughout the winter. In the case of Alternative E-1A, MnDOT is also planning to collect the stormwater from the fill or bridge crossing, preventing it from draining directly into the pit. Piping would convey the stormwater to the proposed ponding identified above.

5.5.3.5 Alternative E-2

Alternative E-2 (Straight Option and Curved Setback Option) applies the same two typical sections along the alignment as Alternative M-1. The rural typical section was proposed where possible which directs runoff from the roadway into grassed swales located within the approximately 40-foot center median and on each side of the roadway. The constrained cross section was assumed for the alignment crossing through the Rouchleau Pit. Stormwater runoff would be collected and conveyed within a storm sewer system for this segment.

The Alternative E-2 alignment would decrease the impervious surface area by approximately three acres with the Intersection Option, and there would be no net loss or gain of impervious surface area with the Interchange Option. Per NPDES requirements, treatment of stormwater is not required based on the net change in impervious surface area for the project. However, water quality treatment of the stormwater runoff from the constrained cross section would be included to maintain water quality of the Rouchleau Pit (Virginia's water supply).

The wet detention ponds would be designed to meet the requirements of the NPDES permit for water quality treatment for the constrained cross section. For this segment of the alignment, per NPDES requirements, a permanent volume of approximately 0.9 acre-feet would be required. The size of the stormwater pond(s) would be approximately 0.4 acres in surface area (Figure 5.5-3). The discharge of the new pond(s) would be directed away from the Rouchleau Pit. Discharge would be routed to the channel (Manganika Creek) on the west side of the Auburn Pit that ultimately drains to Manganika Lake (Figure 5.1-1). Potential stormwater treatment pond locations are shown in Figure 5.5-3 and are all within existing or proposed right-of-way limits. Per NPDES requirements, discharge may be limited to 5.66 cfs per acre of pond surface area for the water quality storm event.

Construction activities for Alternative E-2 would be similar to Alternative M-1 with the addition of a bridge spanning over the Rouchleau Pit. Erosion and sediment control would be provided during construction in accordance with requirements of the MPCA and NPDES.

MnDOT's current design and maintenance practices include many BMPs, such as installing stormwater ponds, using Road Weather Information Systems, calibrating sanders for road-clearing operations, and removing snow buildup along shoulders throughout the winter. In the case of Alternative E-2, MnDOT would collect stormwater from the bridge, preventing it from draining directly into the pit. Piping on the bridge would convey stormwater to the proposed stormwater ponding identified above.

5.5.4 Avoidance, Minimization, and Mitigation Measures

5.5.4.1 Avoidance and Minimization

Efforts have been made during alternatives development and preliminary engineering of the various alternatives to minimize the addition of new impervious surface to the extent possible by following previously disturbed areas (roads, mined lands).

A SWPPP will be developed and implemented during construction following BMPs as required by the NPDES permit (e.g., silt fence, fiber rolls/ditch checks, temporary sediment basins, stabilization blankets, and seeding) to minimize impacts. Additional BMPs have been described to protect the Rouchleau Pit (e.g., sedimentation ponds and/or infiltration/filtration ponds) and will be developed in coordination with MPCA and MDH.

Any potential contaminant spills on the road, such as gasoline, oil, and antifreeze, would be collected within the storm sewer system on the road and conveyed to treatment ponds where they could be contained for cleanup; therefore, no contaminants would be directly discharged into the pit. Emergency spills would be cleaned up as identified in MnDOT's Emergency Spill Response Technical Memorandum (MnDOT, April 2011).

5.5.4.2 Mitigation Measures

Permanent stormwater features are described above.

5.6 Geology and Soils/Soil Erosion

5.6.1 Methodology

5.6.1.1 Methodology

Background information from geologic and soil mapping was compiled to identify potential project issues and impacts. Information on soil erosion potential was used to assess whether unique conditions exist that would require special erosion prevention measures. In addition to the information provided in this section, unique soil and geologic conditions were identified that could affect project design and construction, as described in Section 5.14.

5.6.2 Existing Conditions

5.6.2.1 Geology

The proposed alternatives lie within the Virginia Horn of the Mesabi Iron Range as shown in Figure 5.6-1. The Virginia Horn is a distinctive geologic feature of northeast Minnesota produced by folding of the local bedrock into an S-like curve around the city of Virginia. Taconite is mined in the Mesabi Iron Range, specifically from the Biwabik Iron Formation. This formation averages one to two miles wide in plan view and belongs to the Paleoproterozoic Animikie Group.[9] The Animikie Group consists of three conformable major formations: the lowermost Pokegama Formation (predominantly quartzite); the Biwabik Iron Formation; and the uppermost Virginia Formation (predominantly argillite, siltstone, and fine-grained greywacke). The Build Alternatives would cross primarily the Biwabik Iron Formation as well as portions of the Virginia and Pokegama Formations. Collectively, these formations dip at varying altitudes and directions in the Virginia Horn area. Along the Alternative M-1, E-1A, and E-2 alignments, iron formation bedrock dips to the west and northwest at angles between five and 15 degrees. Alternatives E-1A and E-2 may cross some Archean metasediments (greywacke and slate) belonging to the Mud Lake sequence along portions and southwest of Landfill Road.

Bedrock in the realignment area is collectively overlain by roughly 50 feet of glacial till and lake sediment of Wisconsinan age, as well as Upper Cretaceous age sediments and weathering residuum.

5.6.2.2 Soils

The majority of the study area has been previously disturbed by past and present mining activities. The majority of the soils within the project area are dominated by a few different soil types. St. Louis County soils information was obtained from the USDA NRCS Web Soil Survey.[10] Hibbing-Buhl complex, Eveleth-Eaglenest-Conic complex, Udorthents, Rifle soils, and Urbanland-McQuade-Buhl Complex were identified as the common natural soil types within the study area. Mine pits, dumps, and tailings were also identified on the Web Soil Survey.

Many of the soils within the study area were classified as rubbly, bouldery, and very bouldery with varying slopes. There were a few mucky depressional soils identified, but these were less than 10 percent of the

[9] Paleoproterozoic rocks were formed about 2.5 to 1.6 billion years ago.

[10] http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed October 2012

overall study area. Drainage classes ranged from very poorly drained (Rifle soils) to well drained (Eveleth-Eaglenest-Conic complex) (see Table 5.6-1).

Table 5.6-1. Study Area Soil Types

Soil Type	Drainage Class	Erosion Rating
Hibbing-Buhl Complex	Moderately well drained	Moderate
Eveleth-Eaglenest-Conic Complex	Well drained	Moderate
Udorthents	Well drained	Not rated
Rifle Soils	Very poorly drained	Slight
Urbanland-McQuade-Buhl Complex	N/A	Not rated

5.6.2.3 Erosion

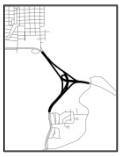
According the USDA NRCS Web Soil Survey, the soil types identified within the project study area have a slight to moderate probability of having erosion issues. A slight probability is defined as a low likelihood of erosion under ordinary climatic conditions. Moderate probability is defined as a high likelihood of erosion, and erosion control measures may be needed.

5.6.3 Environmental Consequences

5.6.3.1 No Build Alternative (Easement Agreement Area Closed)

No construction would occur under the No Build Alternative; therefore, there would be no impact on geology or soils.

5.6.3.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)



No construction would occur under the Existing US 53 Alternative; therefore, there would be no impact on geology or soils.

5.6.3.3 Alternative M-1

Alternative M-1 would relocate the highway to an area south of the current alignment into the Auburn Pit. The proposed alignment crosses the Virginia Horn at a location where waste rock from the mining operation was placed to bridge the mine pit. Since this alternative involves relatively extensive areas of soil disturbance, including steep slopes within the embankment areas of the mine pit, there is a potential for conditions that may require special erosion control measures. It is expected that the steep slopes of the new road embankment will be maintained with reinforced soil slope technology. Refer to Section 5.14 for additional information regarding the engineering challenge of building on this embankment and the relative challenges among alternatives.

5.6.3.4 Alternative E-1A

The alignment for Alternative E-1A crosses areas that have been disturbed previously by mining, road construction, and other activities. Outside of the Rouchleau Pit area, steep slopes that may require erosion control measures may be encountered between the new US 53 alignment and Landfill Road and where the alignment meets the pit walls on each side of the Rouchleau Pit.

The RSS Option would cross the Rouchleau Pit along an existing submerged haul road embankment. Steep slopes of the new road embankment will be maintained with reinforced soil slope technology. Refer

to Section 5.14 for additional information regarding the engineering challenge of building on this embankment and the relative challenges among alternatives.

The Bridge Option would cross the Rouchleau Pit via a bridge. Standard BMPs for working adjacent to surface waters would be implemented to prevent stormwater runoff from entering the pit during construction of the bridge, approaches, and roadway.

5.6.3.5 Alternative E-2

The alignment for Alternative E-2 (Straight Option and Curved Setback Option) crosses areas that have been disturbed previously by mining, road construction, and other activities. Outside of the Rouchleau Pit area, steep slopes that may require erosion control measures may be encountered within newly proposed embankment areas constructed along existing high embankments found on portions of Landfill Road and where the bottom of the slope of a roughly 500-foot stretch of proposed southbound US 53 embankment intersects a high-wall present on the west side of the Rouchleau Pit and near the US 53/2nd Avenue interchange.

Alternative E-2 would cross the Rouchleau Pit via a bridge. Standard BMPs for working adjacent to surface waters would be implemented to prevent storm runoff from entering the pit during construction of the bridge, approaches, and roadway.

5.6.4 Avoidance, Minimization, and Mitigation Measures

Efforts have been made during alternatives development and preliminary engineering of the various alternatives to minimize grading in steep slopes and highly erodible soils to the extent possible by following previously disturbed areas (roads, mined lands).

Design and construction approaches for the Build Alternatives would include a more detailed assessment of the potential for use of special erosion control measures or construction practices to minimize soil erosion. In areas where no special conditions are identified, standard erosion control BMPs for steep slopes and erodible soils would be incorporated into the roadway design plans and specifications for construction.

5.7 Noise

A Noise Impacts Technical Report: US 53 DEIS Virginia-Eveleth (SBP Associates, Inc., 2014) was completed for this project (excerpts included in Appendix H; full report available on the project website).[11] The following provides a summary of the findings of that analysis.

5.7.1 Noise and Noise Descriptors

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithmic measure of sound energy relative to a reference energy level. For highway traffic noise, an adjustment, or weighting, of the high- and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). A sound increase of three dBA is barely perceptible to the human ear, a five dBA increase is clearly noticeable, and a 10 dBA increase is heard twice as loud. For example, if the sound energy is doubled (e.g., the amount of traffic doubles), there is a three dBA increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases to where there is 10 times the sound energy level over a reference level, then there is a 10 dBA increase and it is heard as twice as loud.

In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels that are exceeded 10 percent and 50 percent of the time during the hour of the day and/or night that has

[11] http://www.dot.state.mn.us/d1/projects/hwy53relocation/TechnicalReports.html

the loudest traffic. These numbers are identified as the L_{10} and L_{50} levels. The L_{10} value is compared to FHWA noise abatement criteria.

The following chart[12] provides a rough comparison of the noise levels of some common noise sources.

Sound Pressure Level (dBA)		Noise Source
140	----------	Jet Engine (at 25 meters)
130	----------	Jet Aircraft (at 100 meters)
120	----------	Rock and Roll Concert
110	----------	Pneumatic Chipper
100	----------	Jointer/Planer
90	----------	Chainsaw
80	----------	Heavy Truck Traffic
70	----------	Business Office
60	----------	Conversational Speech
50	----------	Library
40	----------	Bedroom
30	----------	Secluded Woods
20	----------	Whisper

Along with the volume of traffic and other factors (i.e., topography of the area and vehicle speed) that contribute to the loudness of traffic noise, the distance of a receptor from a sound's source is also an important factor. Sound levels decrease as distance from a source increases. The following rule of thumb regarding sound decreases due to distance is commonly used: beyond approximately 50 feet, each time the distance between a line source (such as a road) and a receptor is doubled, sound levels decrease by three decibels over hard ground, such as pavement or water, and by 4.5 decibels over vegetated areas.

5.7.2 Regulatory Context

5.7.2.1 State of Minnesota Noise Regulations

Minnesota State Noise Standards have been established specifically for daytime and nighttime periods. The MPCA defines daytime as 7:00 a.m. to 10:00 p.m. and nighttime as 10:00 p.m. to 7:00 a.m. For residential land uses including apartments, churches, and schools (Noise Area Classification 1 or NAC-1), the Minnesota State Standards for L_{10} are 65 dBA for daytime and 55 dBA for nighttime; the standards for L_{50} are 60 dBA for daytime and 50 dBA for nighttime. For NAC-1, the daytime standard applies during nighttime hours if the land use activity does not include overnight lodging. For commercial land uses (NAC-2), the Minnesota State Standards for L_{10} are 70 dBA for daytime and nighttime; the standards for L_{50} are 65 dBA for daytime and nighttime. Minnesota State Noise Standards are shown in Table 5.7-1.

Table 5.7-1. Minnesota State Noise Standards

Land Use	Code	Day (7 a.m. – 10 p.m.) dBA		Night (10 p.m. – 7 a.m.) dBA	
Residential	NAC-1	L_{10} of 65	L_{50} of 60	L_{10} of 55	L_{50} of 50
Commercial	NAC-2	L_{10} of 70	L_{50} of 65	L_{10} of 70	L_{50} of 65
Industrial	NAC-3	L_{10} of 80	L_{50} of 75	L_{10} of 80	L_{50} of 75

[12] Source: "A Guide to Noise Control in Minnesota," MPCA, http://www.pca.state.mn.us/programs/pubs/noise.pdf; "Highway Traffic Noise," FHWA, http://www.fhwa.dot.gov/environment/htnoise.htm

5.7.2.2 Federal Noise Abatement Criteria (NAC)

In the federal Noise Abatement Criteria (NAC), for residential and recreational uses (Federal Land Use Category B), the federal L_{10} standard is 70 dBA for both daytime and nighttime. For commercial and industrial areas (Federal Land Use Category C), the federal L_{10} standard is 75 dBA for both daytime and nighttime. Locations must be evaluated for noise abatement reasonableness where noise levels are "approaching" (defined in Minnesota as being within one decibel of the criterion threshold, i.e., 69 and 74 dBA) or exceeding the criterion level. The federal NAC are shown in Table 5.7-2. If noise levels exceed the Minnesota State Noise Standards, they would also exceed the federal NAC.

In addition to the identified noise criteria, the FHWA also defines a noise impact as a "substantial increase" in the future noise levels over the existing noise levels. MnDOT considers an increase of five dBA or greater to be a substantial noise level increase.

Table 5.7-2. Federal Noise Abatement Criteria

Activity Category	Activity Criteria[A, B] L10(h) dBA	Evaluation Location	Activity Description
A	60	Exterior	Exterior lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B[C]	70	Exterior	Residential
C[C]	70	Exterior	Exterior active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E[C]	75	Exterior	Exterior hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F
F	-----	-----	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	-----	-----	Undeveloped lands that are not permitted

[A] L 10(h) shall be used for impact assessment.
[B] The L 10(h) Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.
[C] Includes undeveloped lands permitted for this activity category

5.7.3 Methodology

5.7.3.1 Defining Noise Sensitive Areas for Alternatives

Noise Impact Areas for the No Build Alternative

For the No Build Alternative, the existing and 2037 noise levels were determined for receptors along the following alternate roadway corridors:

- Co. 7: This is the main north-south alternative to US 53
- MN 37 South: MN 37 will serve as a route from US 53 to Co. 7
- MN 37 North: This portion of MN 37 is between US 53 and Gilbert
- Co. 101: Co. 101 through Eveleth will serve as a local route from US 53 to Co. 7

These roadways, along with the modeled receptor locations, are shown in Figure 5.7-1.

Noise Impact Areas for the Existing US 53, M-1, E-1A, and E-2 Alternatives

For this analysis, seven potentially impacted areas (Areas A, B, C, D, E, F, and G) were defined along the US 53 corridor. Noise receptors were chosen for impact analysis within each of these areas. The areas and receptors are shown on Figure 5.7-4 and are described as follows:

- Area A: North of US 53 and East of 12th Avenue
  - Five receptors: R15A, R15B, R15F, R16, and R17
  - This area is primarily commercial and retail properties in addition to two religious facilities
- Area B: City Park – Ball Fields
  - Nine receptors: R19A, R19B, R19C, R19, R19D, R19E, R20, R20A, and R20B
  - This area is the City Park ball fields on the north side of US 53
- Area C: Residential Area North of US 53 and East of 2nd Avenue West
  - 19 receptors: R21, R22, R23, R24, R26, R26A, R26B, R29, R30, R31, R34, R35, R36, R37, R40, R41, R43, R44, and R46
  - This area includes residential and industrial properties north of the Existing US 53 corridor and east of 2nd Avenue
- Area D: South of US 53 and East of 12th Avenue
  - Six receptors: R12A, R12A2, R12B, R12C, R14, and R15
  - This is the commercial area bordering the south side of US 53 and the residential area bordering 17th Street behind the commercial area
- Area E: Neighborhood South of US 53 and near Southern Drive and Cottage Lane
  - Six receptors: R8, R9, R10, R10A, R12, and R13
  - This is the residential area west of where Alternative M-1 comes into town
- Area F: Midway Area – Vermillion Drive to Cuyuna Drive
  - 14 receptors: R2, R2B, R2C, R1, R3, R4, R5, R5A, R5B, R5C, R5D, R6, R7, and R51
  - This area includes the businesses bordering US 53 and the residences immediately behind them

- Area G: Bourgin Road
    - Two receptors: R51A and R51B
    - This area includes two residential properties on the west side of Bourgin Road north of the Midway area

Existing and 2037 noise levels were determined at the receptors in each of these areas for the Existing US 53, M-1, E-1A, and E-2 Alternatives.

5.7.3.2 Impacts Methodology and Assumptions

Existing and future (2037) noise levels were modeled using the noise analysis software MINNOISEV3.1, a modified version of the FHWA noise prediction model STAMINA 2.0.

The following assumptions were used in assessing corridor noise impacts:

- Traffic data for existing conditions, 2017, and 2037 for the study area was provided in the Traffic Analysis Technical Report (CH2M Hill, 2013). The US 53 corridor modeling is based on the summer peak-hour values of 10 percent of annual average daily traffic (AADT) for daytime peak-hour and 3.5 percent of AADT for nighttime peak-hour.
- Traffic speed limits used in the modeling are:
    - US 53: 45 mph west of 6th Avenue and 55 mph east of 6th Avenue
    - MN 37 North: 30 mph in downtown Gilbert, 40 mph west side of Gilbert, and 55 mph west of Gilbert
    - Co. 7: 55 mph south of Tamarack Drive and 30 mph north of Tamarack Drive
    - Co. 101: 30 mph in Eveleth and 55 mph west of Eveleth
    - MN 37 South: 55 mph
- The analysis assumed acoustically soft ground cover between the roadway and all receptor locations

Traffic noise impacts were assessed by modeling daytime and nighttime peak noise hour existing and 2037 Build and No Build noise levels at receptor sites located within the study area. MnDOT Automatic Traffic Recorder (ATR) data was used to model noise levels at two representative receptors to determine the highest noise hour of the day. The results are included in Appendix H. For this analysis, the hourly data that contained the highest AADT and the highest truck volumes were analyzed. With this methodology, there would be no higher noise hour because either the truck volume would be lower, the AADT would be lower, or both, and there would therefore be lower noise levels. For the portion of the project north of MN 135, the peak daytime noise hour was found to be from 1:00 p.m. and 2:00 p.m. For the portion of the project south of MN 135, the peak daytime noise hour was found to be from 3:00 p.m. and 4:00 p.m. The highest nighttime noise hour is between 6:00 a.m. and 7:00 a.m., which has the highest total AADT and truck trips between 10:00 p.m. and 7:00 a.m.

For the No Build Alternative, levels of service are expected to be poor throughout most of the day and worse than for all other alternatives due to significantly more traffic traversing fewer roadway lanes. As a result, travel speeds are expected to be slower than for other alternatives throughout most of the day along the alternate routes. For the No Build Alternative, peak noise hour traffic assumes traffic speeds at five mph less than posted during an hour when volume is about half of the peak volume. This is a conservative approach that will result in all potential noise impacts to represent the worst case.

Noise modeling receptors were selected at commercial, industrial, and residential sites along the alternative corridors. Receptor locations were chosen based on guidance provided in Appendix B of the June 1, 2011 MnDOT Noise Policy.

5.7.4 Noise Monitoring

In addition to noise modeling, noise monitoring was also conducted at locations along the project corridor to assist in defining existing noise levels and to validate the model. Monitoring locations are shown in Figures 5.7-1 and 5.7-2. A comparison of monitored and modeled noise levels is provided in the Noise Impacts Technical Report (SBP Associates, 2013). The modeled traffic volumes were based on traffic counts conducted during the monitoring. The model shows good agreement (within three dBA) with the monitoring results for all monitoring periods.

5.7.5 Noise Impacts Modeling Results

5.7.5.1 No Build Alternative (Easement Agreement Area Closed)

Roadways expected to have significantly increased traffic volumes under the No Build Alternative include the following:

- Co. 7
- MN 37 South
- MN 37 North
- Co. 101

Traffic volumes would be substantially reduced along the existing US 53 corridor between MN 37 on the south and US 169 on the north, resulting in reduced noise levels along the corridor in Virginia. See Figure 5.7-1 for the noise impacts along the No Build Alternative reroute roadways.

Co. 7

Receptors P43, P43A, C43A, P45, P46, P47, P47, P48, P49, P49A, P49B, P50, P51, P52, P53, P53A, P55, P57-2, P57A, P57B, P57D, P63, P66, P67, P70-3, P70A, P70B, P71, P71A, P71B, P72, P73, P75, P77, P78, P83, P84, P92, P92A, P92B, P93, P96, C97, P101, P103, P108, P108A, P108B, P108C, P108D, P108E, P108F, P108G, C109, P109, P109A, P109B, P109C, P109D, P109E, P109F, P110, P111, P112, C114, P114, P117, P117A, C118, and P118

Co. 7 is the main north-south alternative to US 53. The noise levels were modeled at 70 receptor locations along this roadway between MN 37 and US 169. With the existing transportation network, in 2017 two of the modeled locations would exceed the daytime Minnesota residential noise standards, and 27 of the modeled locations would exceed the nighttime Minnesota residential noise standards.

Under the 2037 No Build conditions, 22 of the modeled locations would exceed the daytime Minnesota residential noise standards, and 50 of the modeled locations would exceed the nighttime Minnesota residential noise standards.

The modeled L_{10} noise level increase ranges from 3.1 to 8.6 dBA during the peak daytime hour and from 4.3 to 10.7 dBA during the peak nighttime hour. MnDOT noise policy considers a noise level increase of five dBA or more to be significant.

Complete model results for this corridor are provided in Table B-1 of Appendix H.

MN 37 South – US 53 to Co. 7

Receptors P0, P1, P2, P3, P3A, P11, P11A, P11B, P11C, P12, P12A, P13, P14, P15, P16, P17, P17A, P18, P19, P20, P21, P21A, P22, P22A, P23, P24, P24A, P25, P26, P36, P37, P38, P39, P40, P41, P42, P42A

MN 37 would serve as a route from US 53 to Co. 7 should the segment of US 53 within the existing easement agreement area be removed. Noise levels were modeled at 37 receptor locations along this roadway between US 53 and Co. 7. With the existing transportation network, in 2017 none of the modeled locations would exceed the daytime Minnesota residential noise standards, and 23 of the modeled locations would exceed the nighttime Minnesota residential noise standards.

Under the 2037 No Build conditions, 10 of the modeled locations would exceed the daytime Minnesota residential noise standards, and 30 of the modeled locations would exceed the nighttime Minnesota residential noise standards.

The modeled L_{10} noise level increase ranges from 2.3 to 2.9 dBA during the peak daytime hour and from 3.2 to 6.8 dBA during the peak nighttime hour. MnDOT noise policy considers a noise level increase of five dBA or more to be significant.

Complete model results for this corridor are provided in Table B-2 of Appendix H.

Co. 101 – US 53 to Co. 7

Receptors P129, P129A, P130, P131, P135, P137, P155, P156, P159, P162, P163, and P164

Co. 101 through Eveleth would serve as a route from US 53 to Co. 7 under the No Build Alternative. The noise levels were modeled at 12 receptor locations along this roadway between US 53 and Co. 7. With the existing transportation network, in 2017 none of the modeled locations would exceed the daytime Minnesota residential noise standards, and 10 of the modeled locations would exceed the nighttime Minnesota residential noise standards.

Under the 2037 No Build conditions, eight of the modeled locations would exceed the daytime Minnesota residential noise standards, and all 12 of the modeled locations would exceed the nighttime Minnesota residential noise standards.

The modeled L_{10} noise level increase ranges from 2.7 to 3.2 dBA during the peak daytime hour and from 6.5 to 7.6 dBA during the peak nighttime hour. MnDOT noise policy considers a noise level increase of greater five dBA or more to be significant.

Complete model results for this corridor are provided in Table B-3 of Appendix H.

MN 37 North – US 53 to MN 135 in Gilbert

Receptors N72, N73, N74, N77, N77A, N78, N81, N83, N84, N88, N93, N94, N95, N99, N99A, and N101

MN 37 would serve as a route from US 53 to MN 135 in Gilbert under the No Build Alternative. Noise levels were modeled at 16 receptor locations along this roadway between US 53 and MN 135. With the existing transportation network, in 2017 two of the modeled locations would exceed the daytime Minnesota residential noise standards, and eight of the modeled locations would exceed the nighttime Minnesota residential noise standards.

Under the 2037 No Build conditions, four of the modeled locations would exceed the daytime Minnesota residential noise standards, and 12 of the modeled locations would exceed the nighttime Minnesota residential noise standards.

The modeled L_{10} noise level increase is from 1.7 to 2.0 dBA during the peak daytime hour and from 3.4 to 4.4 dBA during the peak nighttime hour. MnDOT noise policy considers a noise level increase of five dBA or more to be significant.

Complete model results for this corridor are provided in Table B-4 of Appendix H.

US 53 Corridor – Between MN 37 South and US 169

This portion of US 53 would see substantial reduction in traffic under this alternative. The portion south of the mine will serve the Midway area, and the portion north of the mine will serve local traffic in Virginia.

Because of the substantial decrease in traffic in these areas under the 2037 No Build conditions, noise levels would be substantially reduced (by up to 10 dBA in some locations). The model results for each receptor in Areas A – F are provided in Tables B-5 through B-10 in Appendix H.

5.7.5.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)

For this alternative, changes in noise levels from existing to 2037 conditions would be due only to predicted traffic volume growth over that period (see Figure 5.7-2).

Area A: North of US 53 and East of 12th Avenue

Receptors R15A, R15B, R15F, R16, and R17

Under the 2037 modeled conditions, noise levels would meet Minnesota standards and federal NAC in this area.

The maximum modeled L_{10} noise level increase in this area is 0.8 dBA for the daytime peak hour and 0.8 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results for each modeled receptor in this area are provided in Table A-1 of Appendix H.

Area B: City Park – Ball Fields

Receptors R19A, R19B, R19C, R19, R19D, R19E, R20, R20A, and R20B

Under the 2037 modeled conditions, noise levels would meet Minnesota standards and federal NAC in this area.

The maximum modeled L_{10} noise level increase in this area is 0.9 dBA for the daytime peak hour and 1.0 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results for each modeled receptor in this area are provided in Table A-2 of Appendix H.

Area C: Residential Area North of US 53 and East of 2nd Avenue West

Receptors R21, R22, R23, R24, R26, R26A, R26B, R29, R30, R31, R34, R35, R36, R37, R40, R41, R43, R44, and R46

Under the 2037 modeled conditions, noise levels would exceed Minnesota nighttime standards at four residential receptors in this area.

The maximum modeled L_{10} noise level increase in this area is 0.9 dBA for the daytime peak hour and 0.7 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results for each modeled receptor in this area are provided in Table A-3 of Appendix H.

Area D: South of US 53 and East of 12th Avenue

Receptors R12A, R12A2, R12B, R12C, R14, and R15

Under the 2037 modeled conditions, noise levels would exceed Minnesota nighttime standards (L_{10} and L_{50}) at four residential receptors in this area.

The maximum modeled L_{10} noise level increase in this area is 0.9 dBA for the daytime peak hour and 0.9 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results for each modeled receptor in this area are provided in Table A-4 of Appendix H.

Area E: Neighborhood South of US 53 and near Southern Drive and Cottage Lane

Receptors R8, R9, R10, R10A, R12, and R13

Under the 2037 modeled conditions, noise levels would exceed the Minnesota nighttime L_{10} and L_{50} standards at four and five residential receptors, respectively.

The maximum modeled L_{10} noise level increase in this area is 0.8 dBA for the daytime peak hour and also 0.8 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-5 of Appendix H.

Area F: Midway Area – Vermillion Drive to Cuyuna Drive

Receptors R2, R2B, R2C, R1, R3, R4, R5, R5A, R5B, R5C, R5D, R6, R7, and R51

Under the 2037 modeled conditions, noise levels would exceed the Minnesota nighttime standards (L_{10} and L_{50}) at nine residential receptors and approach the daytime standard at one commercial receptor.

The maximum modeled L_{10} noise level increase in this area is 0.8 dBA for the daytime peak hour and 0.9 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-6 of Appendix H.

Area G: Bourgin Road

Receptors R51A and R51B

Under the 2037 modeled conditions, noise levels would be within the Minnesota daytime and nighttime standards at the two residences.

The maximum modeled L_{10} noise level increase in this area is 0.7 dBA for the daytime peak hour and also 0.7 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-7 of Appendix H.

5.7.5.3 Alternative M-1

Results of the noise analysis for Alternative M-1 are shown on Figure 5.7-3.

Area A: North of US 53 and East of 12th Avenue

Receptors R15A, R15B, R15F, R16, and R17

Under the 2037 modeled conditions, noise levels would meet Minnesota standards and federal NAC in this area.

The maximum modeled L_{10} noise level increase at any receptor in this area is 0.7 dBA for the daytime peak hour and 0.8 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-1 of Appendix H.

Area B: City Park – Ball Fields

Receptors R19A, R19B, R19C, R19, R19D, R19E, R20, R20A, and R20B

Noise levels would drop substantially in this area with Alternative M-1 because the US 53 corridor would be moved to the south.

Modeled daytime and nighttime noise impact results are provided in Table A-2 of Appendix H.

Area C: Residential Area North of US 53 and East of 2nd Avenue West

Receptors R21, R22, R23, R24, R26, R26A, R26B, R29, R30, R31, R34, R35, R36, R37, R40, R41, R43, R44, and R46

Under 2037 modeled conditions, the noise levels in this area would decrease because the US 53 corridor would be moved to the south.

Modeled daytime and nighttime noise impact results are provided in Table A-3 of Appendix H.

Area D: South of US 53 and East of 12th Avenue

Receptors R12A, R12A2, R12B, R12C, R14, and R15

Under the 2037 modeled conditions, noise levels would exceed Minnesota nighttime standards at four residential receptors in this area.

The maximum modeled L_{10} noise level increase in this area is 1.4 dBA for the daytime peak hour and 1.4 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-4 of Appendix H.

Area E: Neighborhood South of US 53 and near Southern Drive and Cottage Lane

Receptors R8, R9, R10, R10A, R12, and R13

Under the 2037 modeled conditions, noise levels would exceed the Minnesota nighttime standards at five residential receptors.

The maximum modeled L_{10} noise level increase in this area is 4.0 dBA for the daytime peak hour and also 4.0 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-5 of Appendix H.

Area F: Midway Area – Vermillion Drive to Cuyuna Drive

Receptors R2, R2B, R2C, R1, R3, R4, R5, R5A, R5B, R5C, R5D, R6, R7, and R51

Under the 2037 modeled conditions, noise levels would exceed the Minnesota nighttime standard at nine residential receptors.

The maximum modeled L_{10} noise level increase in this area is 0.8 dBA for the daytime peak hour and 0.9 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-6 of Appendix H.

Area G: Bourgin Road

Receptors R51A and R51B

Under the 2037 modeled conditions, noise levels would be within the Minnesota daytime and nighttime standards at the two residences.

The modeled L_{10} noise levels decrease in this area by a minimum of 3.6 dBA for the daytime peak hour and 3.0 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-7 of Appendix H.

5.7.5.4 Alternative E-1A (RSS Option and Bridge Option)

Results of the Alternative E-1A noise analysis are depicted in Figure 5.7-4. There was no difference in the analysis between the RSS Option and Bridge Option. The Intersection and Interchange Option impacts are described under Area G.

Area A: North of US 53 and East of 12th Avenue

Receptors R15A, R15B, R15F, R16, and R17

Under the 2037 modeled conditions, noise levels would meet Minnesota standards and federal NAC in this area.

The maximum modeled L_{10} noise level increase at any receptor in this area is 0.8 dBA for the daytime peak hour and 0.8 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-1 of Appendix H.

Area B: City Park – Ball Fields

Receptors R19A, R19B, R19C, R19, R19D, R19E, R20, R20A, and R20B

Under the 2037 modeled conditions, noise levels would meet Minnesota standards and federal NAC in this area.

The maximum modeled L_{10} noise level increase at any receptor in this area is 0.3 dBA for the daytime peak hour and 0.3 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-2 of Appendix H.

Area C: Residential Area North of US 53 and East of 2nd Avenue West

Receptors R21, R22, R23, R24, R26, R26A, R26B, R29, R30, R31, R34, R35, R36, R37, R40, R41, R43, R44, and R46

Under the 2037 modeled conditions, noise levels would exceed the Minnesota daytime L_{10} standard at one residential receptor, the daytime L_{50} standard at two residential receptors, and nighttime standards at 14 residential receptors.

The maximum modeled L_{10} noise level increase at any receptor in this area is 12.5 dBA for the daytime peak hour and 11.3 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-3 of Appendix H.

Area D: South of US 53 and East of 12th Avenue

Receptors R12A, R12A2, R12B, R12C, R14, and R15

Under the 2037 modeled conditions, noise levels would exceed Minnesota nighttime standards (L_{10} and L_{50}) at four residential receptors in this area.

The maximum modeled L_{10} noise level increase in this area is 0.9 dBA for the daytime peak hour and 0.9 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-4 of Appendix H.

Area E: Neighborhood South of US 53 and near Southern Drive and Cottage Lane

Receptors R8, R9, R10, R10A, R12, and R13

Under the 2037 modeled conditions, noise levels would exceed the Minnesota nighttime L_{10} and L_{50} standards at three and four residential receptors in this area, respectively.

The maximum modeled L_{10} noise level increase in this area is 0.4 dBA for the daytime peak hour and also 0.4 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-5 of Appendix H.

Area F: Midway Area – Vermillion Drive to Cuyuna Drive

Receptors R2, R2B, R2C, R1, R3, R4, R5, R5A, R5B, R5C, R5D, R6, R7, and R51

Under the 2037 modeled conditions, noise levels would exceed the Minnesota nighttime standards (L_{10} and L_{50}) at nine residential receptors.

The maximum modeled L_{10} noise level increase in this area is 1.0 dBA for the daytime peak hour and 1.1 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-6 of Appendix H.

Area G: Bourgin Road

Receptors R51A and R51B

Under the 2037 modeled conditions, noise levels would exceed the Minnesota nighttime standards at the two residences with the Intersection Option and the Interchange Option.

With the Intersection Option, the maximum modeled L_{10} noise level increase in this area is 11.3 dBA for the daytime peak hour and 11.1 dBA for the nighttime peak hour.

With the Interchange Option, the maximum modeled L_{10} noise level increase in this area is 11.3 dBA for the daytime peak hour and 11.2 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-7 of Appendix H.

5.7.5.5 Alternative E-2

Alternative E-2 noise modeling results are shown on Figure 5.7-5. The impacts described below are for the Straight Option, with the Intersection and Interchange Option impacts described under Area G. The Curved Setback Option impacts in Areas F and G were assumed to be consistent with the Alterative E-1A impacts in these areas (see Section 5.7.5.4).

Area A: North of US 53 and East of 12th Avenue

Receptors R15A, R15B, R15F, R16, and R17

Under the 2037 modeled conditions, noise levels would meet Minnesota standards and federal NAC in this area.

The maximum modeled L_{10} noise level increase at any receptor in this area is 0.8 dBA for the daytime peak hour and 0.8 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-1 of Appendix H.

Area B: City Park – Ball Fields

Receptors R19A, R19B, R19C, R19, R19D, R19E, R20, R20A, and R20B

Under the 2037 modeled conditions, noise levels would meet Minnesota standards and federal NAC in this area.

The maximum modeled L_{10} noise level increase at any receptor in this area is 1.2 dBA for the daytime peak hour and 1.2 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-2 of Appendix H.

Area C: Residential Area North of US 53 and East of 2nd Avenue West

Receptors R21, R22, R23, R24, R26, R26A, R26B, R29, R30, R31, R34, R35, R36, R37, R40, R41, R43, R44, and R46

Under the 2037 modeled conditions, noise levels would exceed the Minnesota daytime L_{10} and L_{50} standards at five and seven residential receptors, respectively, and would exceed nighttime standards at 14 residential receptors.

The maximum modeled L_{10} noise level increase at any receptor in this area is 15.0 dBA for the daytime peak hour and 15.2 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-3 of Appendix H.

Area D: South of US 53 and East of 12th Avenue

Receptors R12A, R12A2, R12B, R12C, R14, and R15

Under the 2037 modeled conditions, noise levels would exceed Minnesota nighttime standards at four residential receptors in this area.

The maximum modeled L_{10} noise level increase in this area is 0.9 dBA for the daytime peak hour and 0.9 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-4 of Appendix H.

Area E: Neighborhood South of US 53 and near Southern Drive and Cottage Lane

Receptors R8, R9, R10, R10A, R12, and R13

Under the 2037 modeled conditions, noise levels would exceed the Minnesota nighttime L_{10} and L_{50} standards at four and five residential receptors in this area, respectively.

The maximum modeled L_{10} noise level increase in this area is 0.7 dBA for the daytime peak hour and 0.7 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-5 of Appendix H.

Area F: Midway Area – Vermillion Drive to Cuyuna Drive

Receptors R2, R2B, R2C, R1, R3, R4, R5, R5A, R5B, R5C, R5D, R6, R7, and R51

Under the 2037 modeled conditions, noise levels would exceed the Minnesota nighttime standards (L_{10} and L_{50}) at nine residential receptors.

The maximum modeled L_{10} noise level increase in this area for this alternative is 0.8 dBA for the daytime peak hour and 0.5 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-6 of Appendix H.

Area G: Bourgin Road

Receptors R51A and R51B

Under the 2037 modeled conditions, noise levels would be within the Minnesota daytime and nighttime standards at the two residences with the Intersection Option and the Interchange Option.

With the Intersection Option, the maximum modeled L_{10} noise level increase in this area is 2.9 dBA for the daytime peak hour and 3.0 dBA for the nighttime peak hour.

With the Interchange Option, the maximum modeled L_{10} noise level increase in this area is 3.0 dBA for the daytime peak hour and 3.3 dBA for the nighttime peak hour.

Modeled daytime and nighttime noise impact results are provided in Table A-7 of Appendix H.

5.7.6 Mitigation

Because the federal NAC and/or state standards would be exceeded at modeled commercial and residential receptor sites, mitigation measures have been analyzed.

It is the policy of FHWA and MnDOT to ensure that projects incorporate all feasible and reasonable abatement measures to minimize highway traffic noise impacts to the extent practicable. When traffic noise impacts are identified, noise abatement shall be considered and evaluated for feasibility and reasonableness.

Feasibility deals primarily with engineering considerations. Reasonableness is based on three required criteria but may be influenced by the consideration of optional criteria. A determination of feasibility and reasonableness includes these minimum required criteria:

- Acoustic Feasibility: At least a five dBA highway traffic noise reduction is achieved at the majority of the impacted receivers
    - At least one receptor per proposed noise barrier must receive the five dBA reduction to achieve acoustic feasibility
- Engineering Feasibility: Determination that it is possible to design and construct the noise abatement measure
    - Considers constructability factors such as safety, barrier height, topography, drainage, utilities, and maintenance
- Reasonableness: Consideration of the viewpoints of benefited residents and owners
    - MnDOT will provide project information and solicit the viewpoints of all of the benefited receptors via phone calls, websites, direct mailings, or in-person meetings
    - The desires of the benefited property owners and residents regarding the construction of proposed noise abatement will be expressed in a vote that will be weighted based on proximity to the proposed improvements

- A simple majority (greater than 50 percent) of all possible voting points for each potential noise abatement measure must vote down the abatement measure to remove it from further consideration

- **Reasonableness:** Allowable cost of highway traffic noise abatement
  - MnDOT has determined a cost effectiveness threshold of $43,500 per individual benefited receptor
- **Reasonableness:** Meets or exceeds the noise reduction design goal
  - MnDOT noise policy establishes a noise reduction design goal of at least seven dBA. This design goal must be achieved at a minimum of one benefited receptor for each proposed noise abatement measure to be considered reasonable.

The reasonableness factors listed must collectively be achieved in order for a noise abatement measure to be deemed reasonable. Failure to achieve any one factor will result in the noise abatement measure being deemed not reasonable.

The noise barriers analyzed are shown in Figures 5.7-3 through 5.7-5.

Following is a description of the mitigation assessment for each of the alternatives.

5.7.6.1 No Build Alternative (Easement Agreement Area Closed)

For the No Build Alternative, sensitive receptor locations along Co. 7, MN 37, and Co. 101 would experience substantial (greater than five dBA) noise level increases due to the increase in traffic volumes during both daytime and nighttime hours. Additionally, the forecast traffic volumes would cause Minnesota noise standards to be exceeded at locations along each of these existing roadways. However, by definition, the No Build Alternative would not include any mitigation measures.

5.7.6.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)

Because this alternative consists of leaving everything in place with no new construction, no mitigation assessment has been completed.

5.7.6.3 Alternative M-1

This alternative potentially impacts Areas A, B, C, D, E, and F. The impact assessment found that Areas D, E, and F have modeled noise levels exceeding Minnesota standards at modeled receptor locations. The noise walls described below are located within the area of evaluation for Alternative M-1, except for a portion of the wall at the west end of Area D. However, the wall at Area D was found to not be feasible or reasonable and, therefore, would require no new right-of-way or impact analysis.

Area D: South of US 53 and East of 12th Avenue

Receptors R14, R15, R12A, R12A2, R12B, and R12C

A 1,100-foot long wall was analyzed for this site. The cost per residence achieving a five dBA reduction is $220,000 for a 20-foot tall wall and $165,000 for a 15-foot tall wall, exceeding the cost-effectiveness requirement of $43,500 per impacted residence. A 10-foot tall wall would not achieve the seven dBA minimum reduction at any receptor.

The wall analysis calculations for this area are summarized in Table D-1 in Appendix H.

Area E: Neighborhood South of US 53 and near Southern Drive and Cottage Lane

Receptors R8, R9, R10, R10A, R12, and R13

A 2,017-foot long wall was analyzed for this site. A 20-foot tall wall would not achieve the minimum seven dBA reduction at any receptor.

The wall analysis calculations for this area are summarized in Table D-2 in Appendix H.

Area F: Midway Area – Vermillion Drive to Cuyuna Drive

Receptors R2, R2B, R2C, R1, R3, R4, R5, R5A, R5B, R5C, R5D, R6, R7, and R51

A 1,366-foot long wall was analyzed for this site. With a 20-foot tall barrier, the cost per residence achieving a five dBA reduction is $32,141, meeting the cost-effectiveness requirement of $43,500 per residence. Therefore, a noise barrier may be further evaluated for this location.

The wall analysis calculations for this area are summarized in Table D-3 in Appendix H.

5.7.6.4 Alternative E-1A (RSS Option and Bridge Option)

This alternative potentially impacts Areas A, B, C, F, and G. The impact assessment found that Areas C, F, and G have modeled noise levels exceeding Minnesota standards at modeled receptor locations. The noise walls described below are located within the area of evaluation for Alternative E-1A.

Area C: Residential Area North of US 53 and East of 2nd Avenue West

Receptors R21, R22, R23, R24, R26, R26A, R26B, R29, R30, R31, R34, R35, R36, R37, R40, R41, R43, R44, and R46

An 805-foot long wall was analyzed for this site. With a 20-foot tall barrier, the cost per receptor achieving a five dBA reduction is $46,000, not meeting the cost-effectiveness requirement of $43,500. Therefore, a noise barrier would likely not be further evaluated for this location.

The wall was analyzed for shortened height and shortened length to determine whether it could be cost-effective. It was found that a wall length shorter than 805 feet would result in two receptors obtaining a noise level reduction that is less than five dBA. This would reduce the number of benefitted receptors and, therefore, would be less cost-effective. Similar to shortening the wall length, reducing the height from 20 feet to 19 feet would result in fewer benefitted receptors, making the wall less cost-effective.

The wall analysis calculations for this area are summarized in Table D-4 in Appendix H.

Area F: Midway Area – Vermillion Drive to Cuyuna Drive

Receptors R2, R2B, R2C, R1, R3, R4, R5, R5A, R5B, R5C, R5D, R6, R7, and R51

An 837-foot long wall was analyzed for this site. With a 20-foot tall barrier, the cost per residence achieving a five dBA reduction is $33,480 for daytime peak-hour traffic conditions and $41,850 for nighttime peak-hour conditions, both meeting the cost-effectiveness requirement of $43,500 per residence. Therefore, a noise barrier may be further evaluated for this location.

The wall analysis calculations for this area are summarized in Table D-5 in Appendix H.

Area G: Bourgin Road

Receptors R51A and R51B

A 417–foot long wall was analyzed for this site. It did not achieve a minimum of seven dBA reduction at either receptor location. Therefore, a noise barrier would likely not be further evaluated for this location.

The wall analysis calculations for this area are summarized in Table D-6 for the Intersection Option and Table D-6A for the Interchange Option in Appendix H.

5.7.6.5 Alternative E-2

Both the Straight Option and the Curved Setback Option potentially impact Area C. The Curved Setback Option would also potentially impact Areas F and G, as described for Alternative E-1A in Section 5.7.6.4. The noise wall described below is located within the area of evaluation for Alternative E-2.

Area C: Residential Area North of US 53 and East of 2nd Avenue West

Receptors R21, R22, R23, R24, R26, R26A, R26B, R29, R30, R31, R34, R35, R36, R37, R40, R41, R43, R44, and R46

A 1,070-foot long wall was analyzed for this site. With a 20-foot tall barrier, the cost per residence achieving a five dBA reduction is $42,800, meeting the cost-effectiveness requirement of $43,500 per residence. Therefore, a noise barrier may be further evaluated for this location.[13]

The wall analysis calculations for this area are summarized in Table D-7 in Appendix H.

5.7.7 Conclusions

This analysis is based on preliminary information. A final determination would involve a more detailed analysis with final design information and input from residents and landowners. A refined mitigation analysis may be conducted for the preferred alternative, if necessary, to confirm if/where noise abatement may be feasible and reasonable based on final design details.

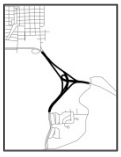
5.7.7.1 No Build Alternative (Easement Agreement Area Closed)

Roadways expected to have substantially increased traffic volumes under the No Build Alternative include Co. 7, MN 37 South, MN 37 North, and Co. 101. Traffic volumes would be substantially reduced along the existing US 53 corridor between MN 37 on the south and US 169 on the north, resulting in reduced noise levels along the corridor in Virginia.

Under the No Build Alternative, sensitive receptor locations along Co. 7, MN 37, and Co. 101 would experience substantial (greater than five dBA) noise level increases due to the increase in traffic volumes during both daytime and nighttime hours. Additionally, the increased traffic volumes would cause Minnesota noise standards to be exceeded at locations along each of these existing roadways.

This alternative impacts a very large area. Some residential areas along these roadways could meet the cost-reasonableness criteria for mitigation with a barrier. However, by definition, the No Build Alternative would not include any mitigation measures, unless it were selected as the preferred alternative.

5.7.7.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)



Under this alternative design, year 2037 noise levels would increase by approximately one dBA compared to current levels. This modeled increase is due to traffic volume growth over time. Because this alternative does not involve any construction or changes in traffic patterns, no mitigation assessment has been conducted.

[13] A noise barrier was found to be reasonable for Alternative E-2 in Area C but not for Alternative E-1A. The Alternative E-1A alignment is farther from the receptors so the noise level increase is less than for Alternative E-2. The cost per receptor to achieve a five dBA reduction exceeded the cost-effectiveness requirement for Alternative E-1A; therefore, a noise barrier in Area C was determined to not be reasonable for that alternative.

5.7.7.3 Alternative M-1

This alternative potentially impacts Areas A, B, C, D, E, and F. The impact assessment found that Areas D, E, and F have modeled noise levels that would exceed Minnesota standards at modeled receptor locations. The mitigation assessment determined that noise barriers at Areas D and E would not meet MnDOT cost-reasonableness criteria under this alternative. Area F met the cost-effectiveness requirement of $43,500 per residence; therefore, a noise barrier would be further evaluated for this location under this alternative.

5.7.7.4 Alternative E-1A (RSS Option and Bridge Option)

This alternative potentially impacts Areas A, B, C, F, and G. The impact assessment determined that Areas A and B meet Minnesota standards. The mitigation assessment determined that noise barriers at Area C and G did not meet MnDOT cost-reasonableness criteria. Area F met the cost-effectiveness requirement of $43,500; therefore, a noise barrier may be further evaluated for this location under this alternative.

5.7.7.5 Alternative E-2

The Straight Option and Curved Setback Option potentially impact Area C. Area C includes residential and industrial properties adjacent to where Alternative E-2 comes into Virginia. Under this alternative, modeled noise levels exceed Minnesota daytime and nighttime standards at residential receptors in this area. Area C met the cost-effectiveness requirement of $43,500 per residence; therefore, a noise barrier may be further evaluated for this location.

The Curved Setback Option would also potentially impact Areas F and G. The mitigation assessment determined that noise barriers at Area G did not meet MnDOT cost-reasonableness criteria. Area F met the cost-effectiveness requirement of $43,500; therefore, a noise barrier may be further evaluated for this location under this option.

5.8 Transportation-Related Air Quality

Per the Scoping Decision Document (February 2012),[14] transportation-related air quality was assessed qualitatively, consistent with FHWA Interim Guidelines for Mobile Source Air Toxics (MSATs) Analysis and the USEPA-approved hotspot screening method for emissions. The project is not located in an area where conformity requirements apply.

5.8.1 Regulatory Context and Methodology

The purpose of the Clean Air Act legislation and NEPA regulation is to protect health and welfare by attaining and maintaining the National Ambient Air Quality Standards (NAAQS). At the project level, NEPA documentation of transportation-related air quality impacts primarily addresses localized emissions of carbon monoxide and MSATs and is performed to assure that violations of the NAAQS would not occur because of the proposed project.

5.8.1.1 NAAQS Criteria Pollutants

Motorized vehicles affect air quality by emitting airborne pollutants. Changes in traffic volumes, travel patterns, and roadway locations affect air quality by changing the number of vehicles and the congestion levels in a given area. The air quality impacts from the proposed project were analyzed by addressing criteria pollutants, a group of common air pollutants regulated by USEPA on the basis of criteria (information on health and/or environmental effects of pollution). The criteria pollutants identified by the USEPA are ozone, particulate matter, carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide.

[14] Available at http://www.dot.state.mn.us/d1/projects/hwy53relocation/scoping.html

Potential impacts resulting from these pollutants are assessed by comparing project concentrations to the NAAQS. A brief description of each criteria pollutant and an assessment of its relevance to this project are provided below.

Ozone

Ground-level ozone is a primary constituent of smog and is a pollution problem throughout many areas of the United States. Exposures to ozone can make people more susceptible to respiratory infection, resulting in lung inflammation, and aggravate preexisting respiratory diseases such as asthma. Ozone is not emitted directly from vehicles but is formed when volatile organic compounds (VOCs) and nitrogen oxides (NOx) react in the presence of sunlight. Transportation sources emit NOx and VOCs and can therefore affect ozone concentrations. However, due to the phenomenon of atmospheric formation of ozone from chemical precursors, concentrations are not expected to be elevated near a particular roadway.

The MPCA, in cooperation with various other agencies, industries, and groups, has encouraged voluntary control measures for ozone and has begun developing a regional ozone modeling effort. Ozone concentrations in the lower atmosphere are influenced by a complex relationship of precursor concentrations, meteorological conditions, and regional influences on background concentrations. MPCA states in Air Quality in Minnesota: 2013 Report to the Legislature (January 2013) that:

> "All areas of Minnesota currently meet the federal ambient eight-hour standard for ozone, but Minnesota is at risk for being out of compliance. In 2008, USEPA tightened the federal eight-hour ambient air standard for ozone to 75 parts per billion (ppb). USEPA plans to propose a revised ozone standard in September 2013, with a final standard planned for 2014. Preliminary documents indicate that USEPA believes the scientific evidence on the health impacts of ozone shows that the current ambient standard is insufficient to protect public health. USEPA's Clean Air Scientific Advisory Committee has recommended that a new ambient standard be set in the range of 60-70 ppb to ensure public health protection with an adequate margin of safety. In 2010, USEPA proposed a revised ozone standard in the range of 60-70 ppb but withdrew the proposal in fall 2011. Many areas of Minnesota would not meet the revised standard if the USEPA sets the standard at the lowest end of the advisory committee's recommended range."

The project is located in an area that has been designated as an unclassifiable/attainment area for ozone. This means that the project area has been identified as a geographic area that meets the national health-based standards for ozone levels and, therefore, is exempt from performing further ozone analyses.

Particulate Matter

Particulate matter (PM) is the term for particles and liquid droplets suspended in the air. Particles come in a wide variety of sizes and have been historically assessed based on size, typically measured by the diameter of the particle in micrometers. PM2.5, or fine particulate matter, refers to particles that are 2.5 micrometers or less in diameter. PM10 refers to particulate matter that is 10 micrometers or less in diameter.

Motor vehicles (i.e., cars, trucks, and buses) emit direct PM from their tailpipes, as well as from normal brake and tire wear. Vehicle dust from paved and unpaved roads may be re-entrained, or re-suspended, in the atmosphere. In addition, PM2.5 can be formed in the atmosphere from gases such as sulfur dioxide, nitrogen oxides, and VOCs. PM2.5 can penetrate the human respiratory system's natural defenses and damage the respiratory tract when inhaled. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:

- Premature death in people with heart or lung disease
- Nonfatal heart attacks
- Aggravated asthma
- Decreased lung function

- Increased respiratory systems, such as irritation of the airways, coughing, or difficulty breathing[15]

On December 14, 2014, the USEPA issued a final rule revising the annual health NAAQS for fine particles (PM2.5). The USEPA website states:

> "With regard to primary (health-based) standards for fine particles (generally referring to particles less than or equal to 2.5 micrometers (µm) in diameter, PM2.5), the USEPA is strengthening the annual PM2.5 standard by lowering the level to 12.0 micrograms per cubic meter (µg/m^3). The existing annual standard, 15.0 µg/m^3, was set in 1997. The USEPA is revising the annual PM2.5 standard to 12.0 µg/m^3 so as to provide increased protection against health effects associated with long- and short-term exposures (including premature mortality, increased hospital admissions and emergency department visits, and development of chronic respiratory disease) and to retain the 24-hour PM2.5 standard at a level of 35 µg/m^3 (the USEPA issued the 24-hour standard in 2006). The USEPA is revising the Air Quality Index (AQI) for PM2.5 to be consistent with the revised primary PM2.5 standards."[16]

The USEPA also retained the existing standards for coarse particular pollution (PM10). The NAAQS 24-hour standard for PM10 is 150 µg/m^3 which is not to be exceeded more than once per year on average over three years.

The Clean Air Act conformity requirements include the assessment of localized air quality impacts of federally-funded or federally-approved transportation projects that are located within PM2.5 nonattainment and maintenance areas and deemed to be projects of air quality concern. The project is located in an area that has been designated as an unclassifiable/attainment area for PM. This means that the project area has been identified as a geographic area that meets the national health-based standards for PM levels and, therefore, is exempt from performing PM analyses.

Nitrogen Dioxide (Nitrogen Oxides)

Nitrogen oxides (NOx) is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Nitrogen oxides form when fuel is burned at high temperatures, as in a combustion process. The primary sources of NOx are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. The MPCA's Air Quality in Minnesota: 2013 Report to the Legislature (January 2013) indicates that:

> "On-road gasoline vehicles and diesel vehicles account for 44 percent of NOx emissions in Minnesota. In addition to being a precursor to ozone, NOx can worsen respiratory irritation and increase risk of premature death from heart or lung disease."

Nitrogen dioxide (NO_2), which is a form of nitrogen oxide (NOx), is regularly monitored in the Twin Cities metropolitan area. Minnesota currently meets federal NO_2 standards according to the 2013 Annual Air Monitoring Network Plan (July 2012). A monitoring site meets the annual NAAQS for NO_2 if the annual average is less than or equal to 53 ppb. The 2011 Minnesota NO_2 monitoring site averages ranged from 5 ppb to 9 ppb; therefore, Minnesota currently meets the annual NAAQS for NO_2.

The USEPA's regulatory announcement, EPA420-F-99-051 (December 1999), described the Tier 2 standards for tailpipe emissions and stated:

> "The new tailpipe standards are set at an average standard of 0.07 grams per mile for nitrogen oxides for all classes of passenger vehicles beginning in 2004. This includes all light-duty trucks, as well as the largest SUVs. Vehicles weighing less than 6,000 pounds will be phased in to this standard between 2004 and 2007.
>
> As newer, cleaner cars enter the national fleet, the new tailpipe standards will significantly reduce emissions of nitrogen oxides from vehicles by about 74 percent by 2030. The standards also will

[15] Source: http://www.epa.gov/air/particlepollution/health.html
[16] Source: http://www.epa.gov/pm/actions.html

reduce emissions by more than two million tons per year by 2020 and nearly three million tons annually by 2030."

Within the project area, it is unlikely that NO_2 standards will be approached or exceeded based on the relatively low ambient concentrations of NO_2 in Minnesota and on the long-term trend toward reduction of NO_2 emissions. Because of these factors, a specific analysis of NO_2 was not conducted for this project.

Sulfur Dioxide

Sulfur dioxide (SO_2) and other sulfur oxide gases (SOx) are formed when fuel containing sulfur, such as coal, oil, and diesel fuel, is burned. Sulfur dioxide is a heavy, pungent, colorless gas. Elevated levels can impair breathing, lead to other respiratory symptoms, and, at very high levels, aggravate heart disease. People with asthma are most at risk when SO_2 levels increase. Once emitted into the atmosphere, SO_2 can be further oxidized into sulfuric acid, a component of acid rain.

The MPCA's Annual Pollution Report to the Legislature: A Summary of Minnesota's Air Emissions and Water Discharges (April 2011) indicates that on-road mobile sources account for just 14 percent of SO_2 emissions in Minnesota. Over 53 percent of SO_2 released into the air comes from electric utilities, especially those that burn coal. MPCA monitoring shows that ambient SO_2 concentrations are consistently below standards. The MPCA has concluded that long-term trends in both ambient air concentrations and total SO_2 emissions in Minnesota indicate steady improvement.

Emissions of sulfur oxides from transportation sources are a small component of overall emissions and continue to decline due to the desulphurization of fuels. Additionally, Minnesota is classified by the USEPA as a sulfur dioxide attainment area, which means that Minnesota has been identified as a geographic area that meets or exceeds the national standards for the reduction of sulfur dioxide levels. Because of these factors, a quantitative analysis for sulfur dioxide was not conducted for this project.

Lead

Due to the phase out of leaded gasoline, lead is no longer a pollutant associated with vehicular emissions.

Carbon Monoxide (Hot Spot Analysis)

Carbon monoxide is the traffic-related pollutant that has been of concern in the Twin Cities metropolitan area. However, this project is not located in an area where conformity requirements apply, and the scope of the project does not indicate that air quality impacts would be expected. Furthermore, the USEPA has approved a screening method to determine which intersections need hot-spot analysis. The benchmark annual average daily traffic (AADT) volume for hot-spot analysis is 79,400. The highest volume intersection for any of the project alternatives is below this threshold. MnDOT has demonstrated by the results of the screening procedure that there are no signalized intersections included in this project area that require hot-spot analysis. Therefore, no further air quality analysis is necessary.

Additionally, in Minnesota, USEPA Conformity Rule requirements apply to the Twin Cities metropolitan area, the city of Duluth, and the city of St. Cloud. The city of Virginia is not within an area where Conformity Rule requirements apply.

5.8.1.2 Mobile Source Air Toxics (MSATs)

In addition to the criteria air pollutants, the USEPA also regulates air toxics. There are no established criteria for determining when MSATs emissions become a significant issue in the NEPA context because it is still an emerging science. FHWA provides guidance for the analysis of transportation-related air quality in NEPA documentation in its December 6, 2012 document, "Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA." The following discussion of MSATs applicability to the proposed project is based upon this FHWA guidance.

Background

Controlling air toxics emissions became a national priority with the passage of the Clean Air Act Amendments of 1990, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. The USEPA has assessed this expansive list in their latest rule on the Control

of Hazardous Air Pollutants from Mobile Sources[17] and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS).[18] In addition, USEPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA).[19] These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future USEPA rules.

The USEPA rule requires controls that will dramatically decrease MSATs emissions through cleaner fuels and cleaner engines. Based on an FHWA analysis using USEPA's MOVES2010b model, as shown in Figure 5.8-1, even if vehicle-miles traveled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSATs is projected for the same time period.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSATs exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSATs exposure should be factored into project-level decision-making within the context of the NEPA.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSATs impacts in our environmental documents. The FHWA, USEPA, Health Effects Institute (HEI), and others have funded and conducted research studies to try to more clearly define potential risks from MSATs emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

NEPA Context

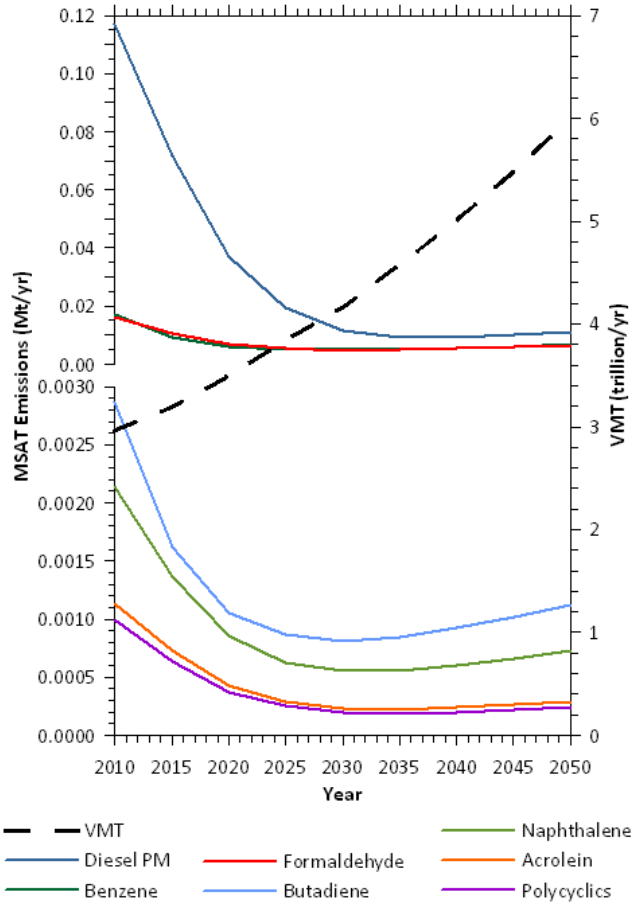
NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the federal government be interpreted and administered in accordance with its environmental protection goals. NEPA also requires federal agencies to use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment. NEPA requires and FHWA is committed to the examination and avoidance of potential impacts to the natural and human environment when considering approval of proposed transportation projects. In addition to evaluating the potential environmental effects, the need for safe and efficient transportation must be taken into account in reaching a decision that is in the best overall public interest. FHWA policies and procedures for implementing NEPA are prescribed by regulation in 23 CFR 771.

[17] Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007

[18] http://www.epa.gov/ncea/iris/index.html

[19] http://www.epa.gov/ttn/atw/nata1999/

Figure 5.8-1. National MSATs Emission Trends (2010-2050) for Vehicles Operating on Roadways Using USEPA's MOVES2010b Model



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles traveled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors
Source: USEPA MOVES2010b model runs conducted during May -June 2012 by FHWA.

Incomplete or Unavailable Information for Project-Specific MSATs Health Impact Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSATs emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSATs exposure associated with a proposed action.

The USEPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSATs. The USEPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects."[20] Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

[20] USEPA, http://www.epa.gov/ncea/iris/index.html

Other organizations are also active in the research and analyses of the human health effects of MSATs, including HEI. Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSATs compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSATs compounds at current environmental concentrations[21] or in the future as vehicle emissions substantially decrease.[22]

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts, each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSATs health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSATs concentrations and exposure near roadways, to determine the portion of time that people are actually exposed at a specific location, and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSATs because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI.[23] As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSATs compounds, and in particular for diesel PM. The USEPA[24] and the HEI[25] have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also a lack of national consensus on an acceptable level of risk. The current context is the process used by the USEPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires USEPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than one in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than one in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the US Court of Appeals for the District of Columbia Circuit upheld USEPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties

[21] Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects (HEI, 2007). Available at http://pubs.healtheffects.org/view.php?id=282

[22] Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects (HEI, 2009). Available at http://pubs.healtheffects.org/getfile.php?u=453

[23] Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects (HEI, 2007). Available at http://pubs.healtheffects.org/view.php?id=282

[24] http://www.epa.gov/risk/basicinformation.htm#g

[25] Summary of Studies of Diesel Exhaust (HEI, 2007). Available at http://pubs.healtheffects.org/getfile.php?u=395

associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities, plus improved access for emergency response, that are better suited for quantitative analysis.

Exposure to MSATs

Because the estimated VMT under each of the Build Alternatives is nearly the same, it is expected that there would be no appreciable difference in overall MSATs emissions among the Build Alternatives.

For all alternatives, emissions are virtually certain to be lower than present levels in the design year as a result of USEPA's national control programs that are projected to reduce annual MSATs emissions by over 80 percent from 2010 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the USEPA-projected reductions is so great (even after accounting for VMT growth) that MSATs emissions in the study area are likely to be lower in the future than they are today.

5.8.2 Existing Conditions

As shown in Figure 3.1-1 in Chapter 3: Transportation Analysis, based on 2009 data, existing US 53 has AADTs ranging from approximately 12,000 from north and south of Virginia to 22,400 in the existing easement agreement area. These traffic volumes are substantially below the benchmark criterion of 79,400 described above. Signalized intersections are located on either side of the existing easement agreement area at 12th Avenue in Virginia and Progress Park Parkway/Grant Avenue in Eveleth.

Co. 7, the north-south route segment of the proposed No Build Alternative, presently has AADTs ranging from 2,000 to 5,700 across its study area corridor. The highest AADT segment of the No Build Alternative is the portion of US 169 between Co. 7 and US 53, which has an AADT of 15,800. The Co. 7 at-grade intersection with Co. 101 is controlled by a stop sign, and the Co. 7 intersection with US 169 is signalized. The Co. 101 connection between US 53 and Co. 7 runs through Eveleth, where there is an AADT of approximately 5,700.

5.8.3 Environmental Consequences

The No Build, M-1, E-1A, and E-2 Alternatives (and their respective options) would not result in an increase in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in MSATs impacts compared to the Existing US 53 Alternative (existing condition). This project has been determined to generate negligible air quality impacts for Clean Air Act Amendments criteria pollutants and has not been linked with any special MSATs concerns as compared to existing conditions.

Moreover, USEPA regulations for vehicle engines and fuels will cause overall MSATs emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with USEPA's MOVES2010b model forecasts a combined reduction of 83 percent in the total annual emission rate for the priority MSATs from 2010 to 2050 while vehicle-miles traveled are projected to increase by 102 percent. This will reduce both the background level of MSATs as well as the possibility of even minor future MSATs emissions.

Future AADTs for the project do not approach the benchmark criterion for a carbon monoxide hot spot air quality analysis described above in Section 5.8.1.1. The location with the highest estimated 2037 AADT is within the No Build Alternative study area at US 169, where the AADT estimate is 45,700 (Figure 3.1-2). The project is not located in an area in which conformity requirements apply, and the scope of the project does not indicate that air quality impacts would be expected. Therefore, no further air quality analysis is necessary.

5.8.4 Avoidance, Minimization, and Mitigation Measures

No transportation-related air quality impacts have been identified for any alternative; therefore, no mitigation is proposed.

5.9 Vegetation and Cover Types

5.9.1 Methodology

The study area for vegetation for each alternative included the area within and directly adjacent to the project alternatives. Potential impacts were based on the areas of evaluation as defined at the beginning of this chapter, in Chapter 2: Alternatives, and shown in Figures 2.1-5, 2.1-6, and 2.2-1.

As previously described, the widened area of evaluation over the Rouchleau Pit was determined to have similar vegetation impacts regardless of where the ultimate road alignment is placed within the widened area. This conclusion was based on the consistent coverage of trees throughout the widened area above the pit (see Figure 5.4-1), which cannot be avoided by any road alignment. Refinements to the preferred alternative layout will evaluate ways to reduce vegetation impacts, which will be reported in the Final EIS.

5.9.2 Existing Conditions

Six cover types occur within the study area and are described below:

- Wetlands

Several different wetland types are present within the project study area, the majority of which were previously disturbed by mining activities. The wetland types include sedge meadows, shallow marshes, and seasonally flooded basins. The sedge meadows contained dogwood (sapling), willow (sapling), river bulrush, sedges, wool grass, blue vervain, and other herbaceous species. Shallow marshes had cattails, river bulrush, soft stem bulrush, wool grass, arrowhead, and burr reed along with other emergent vegetation. The seasonally flooded basins contained numerous different species including speckled alder, aspen, Canada blue-joint grass, sedges, vervain, and jewelweed.

- Wooded/Forest

The wooded/forest areas consisted primarily of successional forest that had been previously disturbed by mining activities. No rare/unique vegetation is present. Species found within canopy layer of the wooded/forest areas were aspen, birch, and pine, with an average diameter at breast height (dbh) of less than eight inches. The understory vegetation was comprised of speckled alder and aspen saplings. The wooded/forest areas had very little herbaceous vegetation as a result of the thick aspen, birch, and pine canopy.

- Shrub/Grassland

The shrub and grassland areas were located in areas that were previously disturbed by mining activities. These areas consisted of aspen, dogwood, and willow saplings with bluegrass, tansy, yarrow, hawkweed, raspberry, and goldenrod. Other notable species include prairie rose, loosestrife, and hawks beard.

- Vegetated Disturbed

Areas categorized as vegetated disturbed include roadway right-of-way, areas adjacent to trails, access roads, and other areas that were recently disturbed but supported vegetation. The dominant species in these areas included dandelions, ragweed, hawkweed, tansy, yarrow, bluegrass, and other vegetation common to highly disturbed areas. These areas are mowed regularly.

- Unvegetated Disturbed

Unvegetated disturbed areas include the mine cliffs for the Rouchleau Pit, the Auburn Pit, and the access roads and trails near the Rouchleau Pit and on adjacent state property.

- Urban

The urban areas include areas within the city of Virginia that are characterized by residential, commercial, or industrial land uses. The urban areas are manicured or have landscaped areas, along with buildings, sidewalks, driveways, and other components found within residential, commercial, or industrial land uses.

Vegetation and cover types were estimated by using aerial photography interpretation and field review during a site visit in June 2012. The estimated acreages of the different identified cover types were calculated for before construction (existing conditions) and after construction of the proposed roadway. The area within the study area would be converted to either impervious surface or vegetated disturbed, such as roadway right-of-way and vegetated medians, where applicable.

5.9.3 Environmental Consequences

The acreages of cover types present within the areas of evaluation for the No Build, M-1, E-1A, and E-2 Alternatives are shown in Table 5.9-1. The Existing US 53 Alternative only impacts the existing US 53 easement agreement area and therefore was not included in the table. The cover type impact areas are based on the areas of evaluation as defined at the beginning of this chapter and shown in Figures 2.1-5, 2.1-6, and 2.2-1. Cover types do not differ between the Alternative E-1A RSS Option and Bridge Option. For Alternative E-2, the Straight Option is shown in Table 5.9-1. The Curved Setback Option would impact approximately an additional 10 acres of wooded/forest area, two acres of wetland, and six acres of shrub/grassland.

Table 5.9-1. Acreage of Cover Types within Study Area Before and After Construction by Alternative[A, B]

Type	No Build (acres)		M-1 (acres)		E-1A (acres)				E-2 (acres)			
					Intersection Option		Interchange Option		Intersection Option		Interchange Option	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Wetlands	4	4	9	0	10	0	11	0	7	0	7	0
Open Water (Rouchleau Pit)	0	0	0	0	23	0	23	0	2	0	2	0
Wooded/ Forest	7	7	8	0	28	0	33	0	33	0	37	0
Shrub/ Grassland	0	0	0	0	6	0	10	0	3	0	3	0
Paved/ Impervious	21	12	38	27	38	34	38	38	35	32	35	35
Unvegetated Disturbed	0	0	21	0	16	0	19	0	6	0	6	0
Vegetated Disturbed	41	50	14	66	21	112	19	117	0	54	0	55
Urban	4	4	3	0	4	0	2	0	0	0	0	0
TOTAL	77	77	93	93	146	146	155	155	86	86	90	90

[A] Total acreage for each alternative reflects the variation in distance and width of the representative corridors within the areas of evaluation.

[B] For Alternatives E-1A and E-2, the acres after construction were calculated based on representative corridors averaging 200-400 feet wide and 150-300 feet wide, respectively.

5.9.4 Avoidance, Minimization, and Mitigation Measures

Efforts have been made during alternatives development and preliminary engineering of the various alternatives to minimize vegetation removal to the extent possible by following previously disturbed areas (roads, mined lands).

Mitigation for wetland impacts is addressed in Section 5.4 of this document and stormwater ponding requirements are addressed in Section 5.5. Due to the previously disturbed nature of much of the area,

no special/unique mitigation is specifically required for the remaining cover type changes. Standard practices for weeds and invasive species would be implemented.

5.10 Fish and Wildlife

5.10.1 Regulatory Context and Methodology

5.10.1.1 Regulatory Context

The Migratory Bird Treaty Act of 1918 (16 USC 703-712) governs the taking, killing, possession, transportation, and importation of migratory birds including eggs, parts, and nests. Such actions are prohibited unless authorized under a valid permit. This law applies to migratory birds native to the United States and its territories. It does not apply to non-native migratory birds or resident species that do not migrate on a seasonal basis.

In general, aquatic habitat identified in the Public Waters Inventory is protected by the DNR through the Public Waters Work Permit. The DNR Public Waters Work Permit and Utility Crossing License ensure that bridge construction or reconstruction is not detrimental to significant fish and wildlife habitat, including measures to protect against obstructing the movement of game fish, disrupting fish spawning, or other practical measures to mitigate effects. Minnesota statutes also provide for the conservation of habitats by controlling weeds (Minnesota Noxious Weed Law 18.376-18.88).

5.10.1.2 Methodology

The areas of evaluation, as described at the beginning of this chapter, were used as the study areas for fish and wildlife. Wildlife associations were determined by reviewing the cover types (Section 5.9) and the type of wildlife that use those cover types for habitat.[26]

The following definitions were used to describe the severity of potential impacts and consider the diversity/integrity of the resource and the relative extent of the impact area:

- Negligible impacts are those that are imperceptible or not detectable. The action would not result in noticeable changes in habitat or wildlife use.
- Minor impacts are those that are slightly detectable and localized but would not affect the overall viability of the wildlife within that area. It is anticipated that wildlife within areas identified as having minor impacts would adapt to habitat changes and/or use adjacent habitat areas.
- Moderate impacts affect an area that is sufficient to cause a perceptible change in wildlife abundance or distribution or habitat quality or quantity, but the change would remain localized.
- Major impacts are those that are substantial, highly noticeable, and permanently impact the overall amount of habitat within the study area. It is anticipated that wildlife within areas with major impacts would not adapt due to a lack of availability of adjacent habitat.

A DNR review of its records for known rare wildlife features was requested. Rare features include the following:

- Native plant communities: Native plant communities are groups of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity over space and time. Although most native plant communities have no legal protection in Minnesota, the Natural Heritage and Nongame Research Program and the Minnesota County Biological Survey have evaluated and ranked community types according to their rarity and endangerment through their range.

[26] According to *Northwoods Wildlife* (Benyus, 1989)

- Animal aggregations: Animal aggregations are tracked regardless of the legal status of the species that comprise them. The tendency to aggregate makes these species vulnerable because a single catastrophic event could result in the loss of many individuals.

Peregrine falcons were identified within the project area during the DNR database record search, with nesting reports in 1991 and 1992 on the pit wall at the north end of the Rouchleau Pit. No sightings have been recorded since that time. The peregrine falcon population has recovered since that time and, as a result, was federally delisted in 1996 and has since been downgraded from threatened to special concern in Minnesota. However, it is still protected under the Migratory Bird Treaty Act.

5.10.2 Existing Conditions

Wildlife around and within the study area are associated with open waterbodies, wetlands, woodlands, right-of-way grassland, previously disturbed shrub-meadows, rural-urban landscaping, and unvegetated disturbed areas such as the operational mine and mine pits.

Table 5.10-1. Wildlife Associations for Habitat Types Found Within the Study Area

Habitat (Cover Type)	Quality	Wildlife
Wetlands	Medium/Low	American bittern, red-winged black bird, herons, small mammals such as mink, muskrat, song birds, harrier, frogs, snakes, turtles, deer, and moose
Wooded Forest	Medium	Grouse, song birds, woodpeckers, fox, raccoon, squirrels, snakes, bats, salamanders, owls, hawks, and wolves
Shrub/Grassland	Medium	Song birds (e.g., swallows), fox, woodchucks, red-tailed hawk, American kestrel, voles, mice, ground squirrels, weasels, snakes, and deer
Vegetated (Disturbed)	Low	Songbirds, hawks, fox, deer, mice, squirrels, snakes, and other small mammals
Unvegetated (Disturbed)	Low	Active mine pit is not considered habitat due to absence of vegetation
Open Water (Rouchleau Pit)	Low	Pit depth not expected to provide preferred habitat for water birds or fowl. Peregrines and other cliff dwellers (e.g., swallows) may use pit walls, but limited for most due to steepness.
Urban	Low	Songbirds, hawks, fox, deer, mice, raccoon, squirrels, snakes, and other small mammals

5.10.3 Environmental Consequences

5.10.3.1 No Build Alternative (Easement Agreement Area Closed)

The No Build Alternative does not involve any new construction; therefore, there would be no impact to wildlife habitat.

5.10.3.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)

No improvements are proposed for the Existing US 53 Alternative. Therefore, there would be no impact to wildlife habitat.

5.10.3.3 Alternative M-1

Some wildlife impacts are anticipated to occur with this alternative; however, with the majority of the corridor located within the Auburn Pit (an area previously/actively disturbed by mining activities), impacts to wildlife would be negligible to minor. The wildlife that inhabit the areas adjacent to the pit are generalist species that are adapted to disturbed areas. These species are generally more tolerant of human presence and activities, including traffic and mining operations (blasting, earthwork, etc.), and have demonstrated by their presence that they adapt readily to anthropogenic changes in their environment. Due to the disturbed nature of the area and the availability of low quality habitat within the Alternative M-1 alignment, the impact to wildlife habitat would be negligible to minor.

No rare features or species were identified in the DNR database search for this alternative. Therefore, no impacts to rare features would occur as a result of Alternative M-1.

5.10.3.4 Alternative E-1A

Some wildlife impacts are anticipated to occur as a result of this alternative. Due to the disturbed nature of the habitat (area previously disturbed from mining activities), the wildlife species that inhabit these areas are generalist species adapted to highly disturbed habitat and anthropogenic disruptions, such as adjacent mining operations and traffic and transit activities. These species have demonstrated by their presence that they adapt readily to anthropogenic changes in their environment.

A negligible to minor impact to wildlife would occur as a result of either the Alternative E-1A RSS Option or Bridge Option, with either the Intersection Option or Interchange Option. The impact is small compared to the large amount of adjacent habitat available to the east and north of this alternative.

Peregrine falcons were identified within the project area during the DNR database record search, with nesting reports in 1991 and 1992 on the pit wall at the north end of the Rouchleau Pit. No sightings have been recorded since that time. The peregrine falcon population has recovered since that time and, as a result, was federally delisted in 1996 and has since been downgraded from threatened to special concern in Minnesota. However, it is still protected under the Migratory Bird Treaty Act. If peregrine falcons are observed during construction, the MnDOT biologist will be contacted for coordination with the DNR Non-Game Program. No other rare features or species were identified during the database search.

5.10.3.5 Alternative E-2

Some wildlife impacts are anticipated to occur as a result of this alternative. Due to the disturbed nature of the habitat (area previously disturbed from mining activities), the wildlife species that inhabit these areas are generalist species adapted to highly disturbed habitat and anthropogenic disruptions, such as adjacent mining operations and traffic and transit activities. These species have demonstrated by their presence that they adapt readily to anthropogenic changes in their environment.

A negligible to minor impact to wildlife would occur as a result of either the Alternative E-2 Straight Option or Curved Setback Option, with either the Intersection Option or Interchange Option. The impact is small compared to the large amount of adjacent habitat available to the east and north of this alternative.

Peregrine falcons were identified within the project area during the DNR database record search, with nesting reports in 1991 and 1992 on the pit wall at the north end of the Rouchleau Pit. No sightings have been recorded since that time. The peregrine falcon population has recovered since that time and, as a result, was federally delisted in 1996 and has since been downgraded from threatened to special concern in Minnesota. However, it is still protected under the Migratory Bird Treaty Act. If peregrine falcons are observed during construction, the MnDOT biologist will be contacted for coordination with the DNR Non-Game Program. No other rare features or species were identified during the database search.

5.10.4 Avoidance, Minimization, and Mitigation Measures

Efforts have been made during alternatives development and preliminary engineering of the various alternatives to minimize vegetation (habitat) removal to the extent possible by following previously disturbed areas (roads, mined lands).

Wildlife habitat impacts will be minimized to the extent possible during further design stages of the project. During the early stages of design refinement for the preferred alternative, bridge structures and the Rouchleau Pit cliffs within the potential construction limits would be field checked in compliance with the Migratory Bird Treaty Act to determine whether swallows or peregrine falcon nesting sites are present. If active swallow or peregrine nests are documented, appropriate mitigation measures would be implemented during construction, such as seasonal work windows or nest removal/netting during the non-nesting season. The measures selected for construction mitigation would be made in consultation with the appropriate agencies.

5.11 Threatened and Endangered Species

5.11.1 Regulatory Context and Methodology

5.11.1.1 Regulatory Context

Federally Listed Species/Designated Critical Habitat

Section 7 of the Endangered Species Act (ESA) of 1973, as amended, requires each federal agency to review any action that it funds, authorizes, or carries out to determine whether it may affect threatened, endangered, or proposed species or listed critical habitat. Federal agencies (or their designated representatives) must consult with the USFWS if any such effects may occur as a result of their actions. Consultation with the USFWS is not necessary if the proposed action will not directly or indirectly affect listed species or critical habitat. If a federal agency finds that an action will have no effect on listed species or critical habitat, it should maintain a written record or that finding that includes the supporting rationale.

Species Proposed for Listing

Section 7(a)(4) requires federal agencies to confer with the USFWS on any agency action that is likely to jeopardize the continued existence of any species proposed for listing or result in the adverse modification of critical habitat proposed to be designated. A conference may involve informal discussions between the USFWS, the action agency, and the applicant. Following informal conference, the USFWS issues a conference report containing recommendations for reducing adverse effects. These recommendations are discretionary because an agency is not prohibited from jeopardizing the continued existence of a proposed species or from adversely modifying proposed critical habitat. However, as soon as a listing action is finalized, the prohibition against jeopardy or adverse modification applies, regardless of the stage of the action.

State Species

Minnesota's endangered species law (Minnesota Statutes, section 84.0895) and associated rules (Minnesota Rules, part 6212.1800-6212.2300) regulate the taking, importation, transportation, and sale of state endangered or threatened species. The DNR administers the state listed rare, threatened, and endangered species.

5.11.1.2 Methodology

The DNR Natural Heritage Information System (NHIS) Database was used to identify potential federal and state listed species within one mile of the project alternatives. The NHIS database comprises locational records of known listed species as well as other rare plants, rare animals, and other rare features including native plant communities, geologic features, and animal aggregations (such as nesting colonies).

A bat survey was also conducted for the project area by the DNR to determine the potential presence of northern long-eared bats. The results of the survey are in the process of being evaluated.

5.11.2 Existing Conditions

Federally Listed Species/Designated Critical Habitat in the Project Area

According to the official County Distribution of Minnesota's Federally Listed Threatened, Endangered, Proposed, and Candidate Species List (revised April 30, 2014) maintained by the USFWS, St. Louis County is within the distribution range of the species listed in Table 5.11-1.

Table 5.11-1. Species with Distribution Ranges in St. Louis County

Species	Status	Habitat
Piping Plover (*Charadrius melodus*) Great Lakes Breeding Population	Endangered and Critical Habitat Designated	Sandy beaches, islands
Canada lynx (*Lynx canadensis*)	Threatened	Northern forest
	Critical Habitat	See Figure 5.11-1
Rufa Red Knot (*Calidris canutus rufa*)	Proposed Threatened	Coastal areas along Lake Superior
Northern long-eared bat (*Myotis septentrionalis*)	Proposed as Endangered	Hibernates in caves and mines (called hibernacula), swarming at entrances of hibernacula in autumn; roosts and forages in upland forests during spring and summer

MnDOT has been in close coordination with the USFWS in regards to both the selection of the appropriate consultation path as well as the level of analysis needed. The following is a breakdown of the determinations made for each species.

- Piping Plover (*Charadrius melodus*): There are no known occurrence records of piping plover in the general vicinity of the proposed project. Based on the location and lack of suitable nesting habitat, it has been determined that this project will have no effect on this species.
- Canada Lynx (*Lynx canadensis*): According to the USFWS, there are documented occurrences of the Canada lynx within 10 miles of the project area and designated critical habitat for this species within five miles. The USFWS concluded that while construction related impacts are expected to occur, they are all within disturbed areas outside of critical habitat where the lynx is less likely to occur. Given that the original highway is being removed and the new highway segment will maintain the same speed limit and remain outside of critical habitat, the USFWS does not feel that there is an increased risk to the lynx. The USFWS concurred with the determination that the project may affect but is not likely to adversely affect the Canada lynx (see Appendix C).

Proposed Federal Species in the Project Area

- Rufa Red Knot (*Calidris canutus rufa*): There are no known occurrence records of the rufa red knot in the general vicinity of the proposed project. Based on the location and lack of suitable nesting habitat, it has been determined that this project will have no effect on this species.
- Northern Long-Eared Bat (*Myotis septentrionalis*): As indicated in the October 2, 2013 Federal Register, the northern long-eared bat is currently proposed for listing as an endangered species in all 87 Minnesota counties. The USFWS is currently working on developing consultation guidance for lead federal agencies to use in making determinations of effect for this species. Until this guidance is distributed and the species officially listed, the lead federal agency must assess the potential for jeopardy.

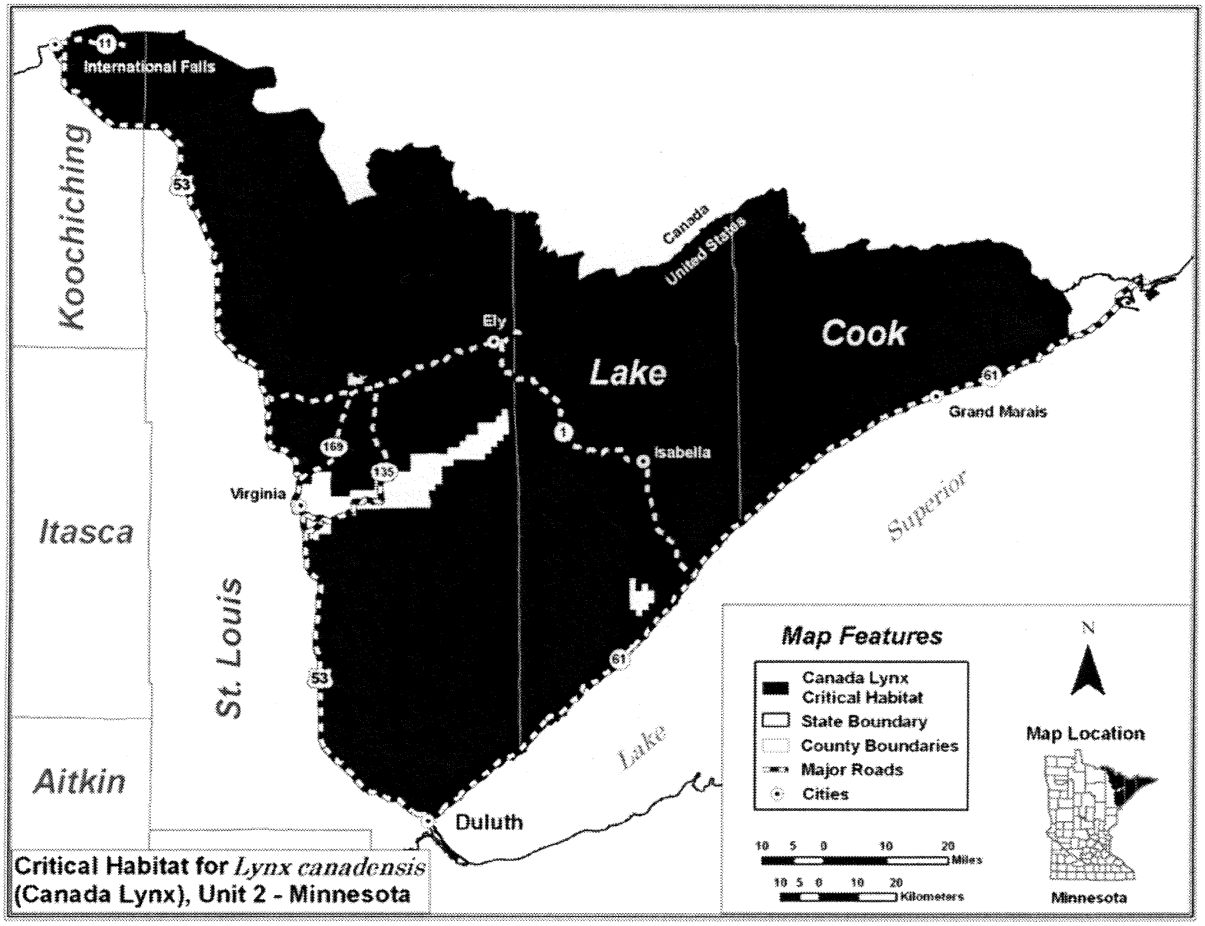
  In order to accurately assess the potential for project related impacts to this species, MnDOT is working with the USFWS and the DNR. Field investigations were conducted in the summer/fall of

2014 and review of findings is underway. The DNR report is not yet finalized; however, discussion with DNR staff indicates that the northern long-eared bat echolocation calls[27] were recorded at each sampling station in the study area (see Figure 5.11-2). The DNR study also identified a mine void in the study area that could be a potential bat hibernaculum (see Figure 5.11-3 for approximate cave location). A copy of correspondence between MnDOT OES and the DNR is included in Appendix C. The information gathered is informing the assessment of the potential for jeopardy/effect. Updated results of studies and on-going coordination will be included in the Final EIS.

State Species

No state listed rare, threatened, or endangered species were identified within the study area. The use of the Rouchleau Pit by the peregrine falcon, a special concern species, has been evaluated within Section 5.10.

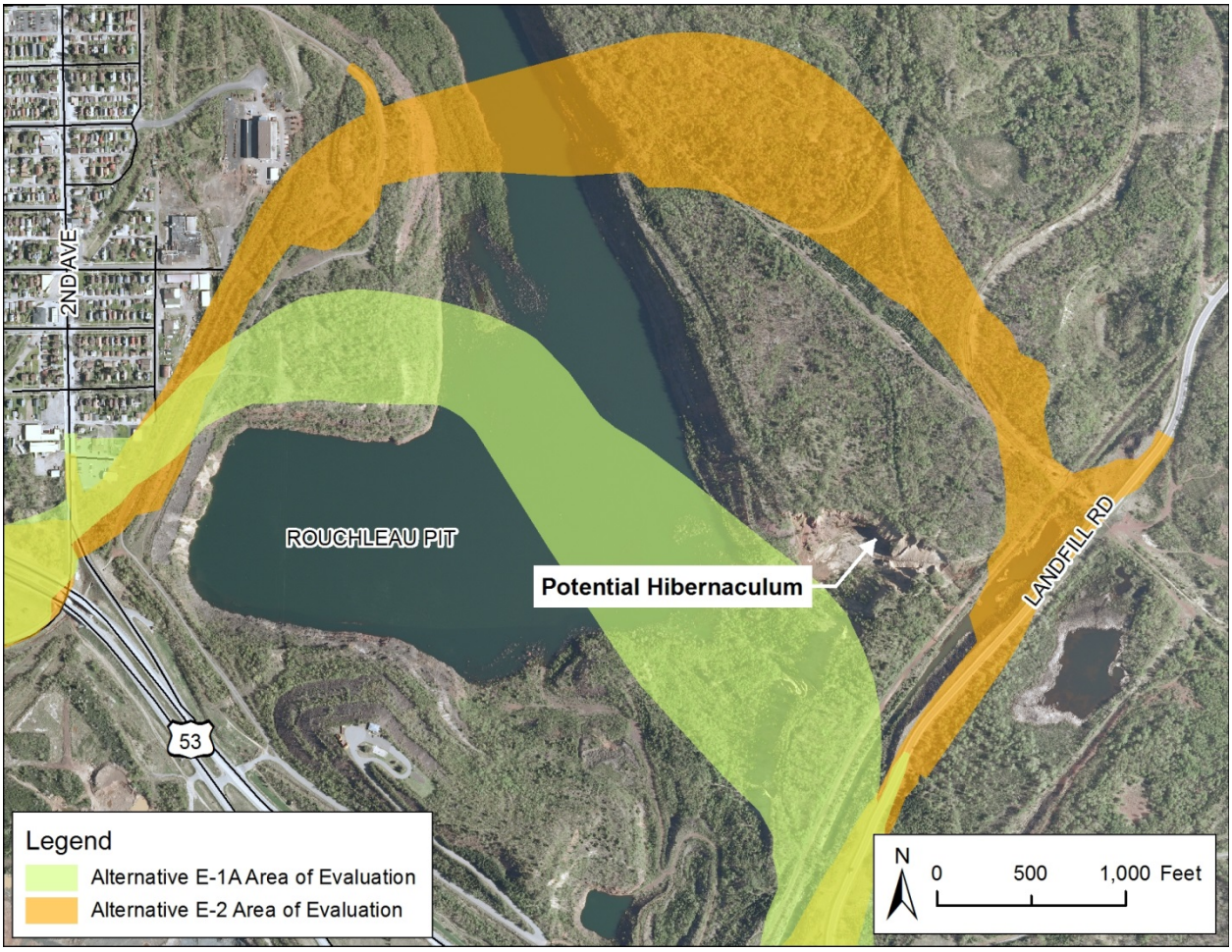
Figure 5.11-1. Critical Habitat for *Lynx canadensis* as Identified within the Recovery Plan



[27] Echolocation is the biological sonar used by several kinds of animals, including bats, for navigation and foraging/hunting. Echolocating animals emit calls out to the environment and listen to the echoes of those calls to locate and identify the objects. The northern long-eared bat's echolocation call distinguishes it from other bat species.

Figure 5.11-2. Northern Long-Eared Bat Sampling Locations

Figure 5.11-3. Potential Northern Long-Eared Bat Hibernaculum



5.11.3 Environmental Consequences

5.11.3.1 No Build Alternative (Easement Agreement Area Closed)

The No Build reroute is west of the critical habitat for the Canada lynx, and the alignment remains within existing right-of-way; therefore, no adverse impacts to the Canada lynx are anticipated.

No state listed rare, threatened, or endangered species were identified by DNR in the study area.

5.11.3.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)

No improvements are proposed for the Existing US 53 Alternative. Therefore, no impacts are anticipated to occur to federal or state rare, threatened, or endangered species.

5.11.3.3 Alternative M-1

The Alternative M-1 alignment is west of critical habitat for the Canada lynx and on the opposite side of US 53. The Alternative M-1 study area is highly disturbed, and the majority of the area is within the existing Auburn Pit. No adverse impacts to the Canada lynx are anticipated.

MnDOT is coordinating with the USFWS and DNR to assess the potential for impacts to the northern long-eared bat, proposed for listing as an endangered species. Based on current information, the impacts of this alternative are not anticipated to jeopardize the continued existence of the species.

As noted in Table 5.11-1, the northern long-eared bat roosts and forages in upland forests during spring and summer. Alternative M-1 results in eight acres of forest habitat impact and, therefore, could potentially affect forest used as summer roosting areas by the northern long-eared bat. This bat also hibernates in caves and mines. The identified cave/potential hibernaculum is not located in the Alternative M-1 area of evaluation.

No state listed rare, threatened, or endangered species were identified by the DNR in the study area.

5.11.3.4 Alternative E-1A

The critical habitat for the Canada lynx is not within the study area for Alternative E-1A (includes the RSS, Bridge, Intersection, and Interchange Options). Due to the disturbed nature of the study area and the lack of boreal forests, no adverse impacts to the Canada lynx are anticipated.

MnDOT is coordinating with the USFWS and DNR to assess the potential for impacts to the northern long-eared bat, proposed for listing as an endangered species. Based on current information, the impacts of this alternative are not anticipated to jeopardize the continued existence of the species.

Alternative E-1A results in the following impacts to forest habitat that could potentially affect forest used as summer roosting areas by the northern long-eared bat:

- Alternative E-1 A (RSS Option or Bridge Option) Intersection Option: 28 acres
- Alternative E-1 A (RSS Option or Bridge Option) Interchange Option: 33 acres

The identified potential hibernaculum is not located in the Alternative E-1A area of evaluation (see Figure 5.11-3).

No state listed rare, threatened, or endangered species were identified by the DNR in the study area.

5.11.3.5 Alternative E-2

The critical habitat for the Canada lynx is not within the study area for Alternative E-2 (includes the Straight, Curved Setback, Intersection, and Interchange Options). Due to the disturbed nature of the study area and the lack of boreal forests, no adverse impacts to the Canada lynx are anticipated.

MnDOT is coordinating with the USFWS and DNR to assess the potential for impacts to the northern long-eared bat, proposed for listing as an endangered species. Based on current information, the impacts of this alternative are not anticipated to jeopardize the continued existence of the species.

Alternative E-2 results in the following impacts to forest habitat that could potentially affect forest used as summer roosting areas by the northern long-eared bat:

- Alternative E-2 Straight Option Intersection Option: 33 acres
- Alternative E-2 Straight Option Interchange Option: 37 acres
- Alternative E-2 Curved Setback Option Intersection Option: 43 acres
- Alternative E-2 Curved Setback Option Interchange Option: 47 acres

The identified potential hibernaculum is not located in the Alternative E-2 area of evaluation.

No state listed rare, threatened, or endangered species were identified by the DNR in the study area.

5.11.4 Avoidance, Minimization, and Mitigation Measures

Efforts have been made during alternatives development and preliminary engineering of the various alternatives to minimize vegetation (habitat) removal to the extent possible by following previously disturbed areas (roads, mined lands).

MnDOT OES has entered into informal consultation with USFWS for the Canada lynx as part of the Section 7 process. MnDOT does not anticipate any project modification as a result of the consultation process. A copy of the correspondence between MNDOT OES and USFWS is included in Appendix C.

In addition, MnDOT is continuing to work with the USFWS to develop avoidance measures where possible and minimize or mitigate unavoidable project related impacts to the northern long-eared bat (proposed for listing under the Endangered Species Act). MnDOT will include relevant completed Section 7 consultation/coordination documentation in the Final EIS.

5.12 Hazardous Materials and Contaminated Properties

This section of the Draft EIS is derived from the Phase I Environmental Site Assessment (ESA) (October 2013), the Phase II Investigation Results (November 2013), and the Subsurface Taconite Assessment and Drilling Report (August 2012), incorporated herein by reference and available on the project website.[28]

5.12.1 Regulatory Context and Methodology

5.12.1.1 Regulatory Context

The MPCA oversees regulations pertaining to contaminated soil, groundwater, and waste cleanup plan approvals; petroleum underground storage tank registration and removal; and NPDES permitting. Activities that encounter contaminated materials must follow state requirements for safe handling and disposal under the purview of the MPCA.

MDH oversees the safe handling and disposal of materials that may cause harm to individuals directly exposed, such as asbestos.

5.12.1.2 Methodology

Potentially Contaminated Sites

A Phase I ESA was conducted for this Draft EIS in October 2011 to identify any potential sources of contamination that could impact the study area. This Phase I ESA was revised in October of 2013 to update and append the 2011 findings. The assessments were carried out in accordance with the requirements of the American Society of Testing and Materials (ASTM) E 1527-05 "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process."

The study area for both reports for potentially contaminated sites included all properties within or adjacent to a 500-foot radius of the alignments for each proposed alternative and within the appropriate ASTM standard search distances for available governmental databases (E1527-05 and 40 CFR 312). These standard search distances vary in size, from adjacent to a proposed alignment to over one mile around an alignment (½ mile on each side). The database search was conducted for each Build Alternative.

For purposes of this document, impacts (potential for contamination) were defined as any sites identified in the Phase I report that are located within the areas of evaluation as shown in Figure 5.12-1.

[28] http://www.dot.state.mn.us/d1/projects/hwy53relocation/TechnicalReports.html

In addition, the area of evaluation for the No Build Alternative is the existing right-of-way for the designated reroute roadways (MN 37, Co. 7, US 169). No improvements outside of these existing right-of-way areas are anticipated.

The Phase I ESA included ranking/classification of all identified sites within the project area as having a high, medium, or low potential for the presence of contamination and justification of these rankings/classifications. These rankings are based on current and past uses of the site and on the use, storage, and/or release of hazardous substances or petroleum products at the site. Rankings are based solely on the sites' potential for the presence of contamination and not on the sites' locations with respect to the area of evaluation.

- Low Risk: Low risk sites are locations where hazardous material or petroleum products may have been stored or used. However, based on subsequent file review and field reconnaissance, no known contamination is associated with the property. Low risk sites include large quantity generators and small to minimal quantity generators.
- Medium Risk: These sites are known to have, or have had, soil and/or groundwater contamination, but current information indicates that contamination is being remediated, does not require remediation, or already requires continued monitoring. Medium risk sites include all closed leak sites and tank sites.
- High Risk: These sites have a high potential for contamination. In some cases, contaminated groundwater may have migrated outside the boundaries of the site. Field investigation of soil and groundwater within planned construction limits may be needed to identify any contributing contamination from these sites and to identify a response action plan to be implemented during construction. High risk sites include all active and inactive Voluntary Investigation and Cleanup (VIC) sites, state and federal Superfund sites, all active leaking underground storage tanks (LUST) sites, unpermitted dump sites, and petroleum brownfield sites.

A Phase II ESA was conducted for the Draft EIS in November 2013 to evaluate subsurface conditions of the sites within the areas of evaluation for Alternatives E-1A and E-2, which were considered to have the highest potential for contamination that could impact proposed construction. The Phase II Investigation locations were selected based on specific areas or properties of potential environmental concern that were noted during the 2013 Phase I ESA for these alignments. In general, investigation locations were selected at parcels/properties classified as having Medium Potential for Contamination or High Potential for Contamination in the 2013 Phase I ESA. The investigation included completion of soil borings B-1 through B-28 (locations shown in Appendix I) between September 23, 2013 and September 26, 2013 using a hydraulically-driven direct-push rig. The total soil boring depths ranged from 7.5 feet to 20 feet below ground surface (bgs). The Phase II ESA also included completion of test trenches T-1 through T-12 on September 24 and 25, 2013. All of the test trenches were completed in Parcel 17 (owned by RGGS). A track-mounted backhoe was used to complete the test trenches. The total test trench depths were 10 feet bgs, except for T-2, which encountered bedrock at two feet bgs. One surface soil sample (Surface Sample-1) was also collected on Parcel 17 to assess a small area where suspected copper wire salvaging activities had occurred.

Soil samples were collected continuously from each soil boring at two-foot intervals. Similarly, soil samples were collected continuously in each test trench as the hole was exposed. The soil samples were examined for evidence of potential contamination, including odors, staining, or debris, and were screened with a photoionization detector (PID) equipped with a 10.6 electron volt (eV) lamp.

Soil samples collected from the test trenches were submitted to Pace Analytical Services of Virginia, Minnesota for analytical testing. The soil samples were analyzed for a combination of the following parameters:

- Diesel range organics (DRO)
- Gasoline range organics (GRO)
- Volatile organic compounds (VOCs)

- Resource Conservation Recovery Act (RCRA) metals
- Semi-volatile organic compounds (SVOCs)

Soil sample Surface Sample-1 was analyzed for polychlorinated biphenyls (PCBs) and RCRA metals.

Roadbed Drilling Investigation

MnDOT performed a Subsurface Taconite Assessment (August 2012) within the existing US 53 corridor. The purpose of the assessment was to evaluate the possible presence of taconite tailings that may have been incorporated into the US 53 road base during construction within the existing US 53 easement agreement area and whether or not these tailings contain asbestos (a regulated material). The investigation included twenty soil borings (locations shown in Appendix I) placed every 0.1 mile along the current alignment and advanced to a depth of five feet. These results were then used to estimate the total cubic yards of taconite tailings within the study area. Nine bulk taconite samples were analyzed with polarized light microscopy (PLM) and transmission electron microscopy (TEM) to determine the presence or lack thereof of asbestos. The PLM laboratory method is used to establish the regulated levels. Regulated levels are defined as materials containing over one percent asbestos using this PLM methodology. In addition to the regulatory-level analysis using PLM, MnDOT also analyzed the samples using the TEM method, which can detect minute levels of asbestos or asbestos-like fibers. Asbestos-like fibers are unregulated materials and have no known regulatory threshold.

MnDOT also reviewed historical construction records to determine the potential for existence of tailings or fill from mining areas from the east range of the Biwabik Iron Formation present in the road base. MnDOT was unable to find evidence of tailings or fill relocated from the east range of the Biwabik Iron Formation to this area. Coordination with St. Louis County has been made to determine if any records exist that identify if tailings were used under Landfill Road, and no records were located.

5.12.2 Existing Conditions

The Subsurface Taconite Assessment and Drilling Investigation (August 2012) estimated that a small amount (23,350 cubic yards) of taconite tailings are present within the existing US 53 right-of-way between the west side of 6th Avenue and 2nd Avenue, which falls within area of evaluation for the No Build Alternative and all Build Alternatives. No asbestos containing materials were detected using the PLM laboratory method.

Using the TEM method, very low (0.0016% and 0.0006%) detections of asbestos-like materials were indicated in two of the nine taconite samples (near 6th Avenue).

5.12.2.1 No Build (Easement Agreement Area Closed)

No potentially contaminated sites were identified within the area of the No Build Alternative.

5.12.2.2 Existing US 53 Alternatives (Easement Agreement Area Remains Open)

No potentially contaminated sites were identified in the area of the Existing US 53 Alternative.

5.12.2.3 Alternative M-1

A total of 17 potentially contaminated sites were identified by the Phase I ESA study area that are at least partially located within the Alternative M-1 area of evaluation, as shown in Figure 5.12-1 and listed in Table 5.12-1.

5.12.2.4 Alternative E-1A

A total of 16 potentially contaminated sites were identified within the Phase I ESA study area that are at least partially located within the Alternative E-1A area of evaluation (including the RSS, Bridge, Intersection, and Interchange Options), as shown in Figure 5.12-1 and listed in Table 5.12-2.

Within the Rouchleau Pit, the submerged haul road embankment that the Alternative E-1A alignment follows was constructed with waste material from within the pit. No asbestos containing materials have been detected within the Rouchleau Pit.

5.12.2.5 Alternative E-2

A total of nine potentially contaminated sites were identified within the Phase I ESA study area that are at least partially located within the Alternative E-2 area of evaluation (including the Straight, Curved Setback, Intersection, and Interchange Options), as shown in Figure 5.12-1 and listed in Table 5.12-3.

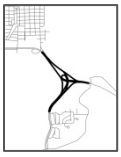
5.12.3 Environmental Consequences

As described above, taconite tailings are present in the existing roadbed in small amounts; however, recent analytical results indicate that the taconite does not contain asbestos. The asbestos-like fibers detected are not regulated and were detected at negligible levels (considerably less than one percent). Therefore, no impacts related to asbestos-containing materials are expected from any alternative.

5.12.3.1 No Build Alternative (Easement Agreement Area Closed)

Due to the nature of the No Build Alternative, no disturbance would take place; therefore, no hazardous sites would be encountered during construction activities.

5.12.3.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)



No disturbance would take place under the Existing US 53 Alternative. This alternative would acquire the existing easement agreement area for permanent right-of-way; however, the Phase II ESA investigation did not find any potentially contaminated sites within the existing easement agreement area.

5.12.3.3 Alternative M-1

Seventeen of the sites identified in the Phase I ESA (Table 5.12-1) are located within the area of evaluation for Alternative M-1, including three high risk, four medium risk, and 10 low risk sites. Sites in bold were evaluated in the Phase II ESA.

Table 5.12-1. Alternative M-1 Sites with Contamination Risk per Phase I ESA

Name	Address	Ranking	Ranking Justification[B]
Bike Path and Wenonah Properties	**208 and 209 E 8th Street**	**High**	Past Mining Activities
Lenci Enterprises, Inc. & Sunrise Equipment Corp.	**1021 S 2nd Ave**	**High**	**VIC (active)**
Vacant Land and Utility Depot	17th Street S and 6th Ave W	High	VIC site (inactive), Hazardous Waste Generator, CERCLIS site
Mine/US 53	South and West of US 53	Medium	Past and Current Mining Activities

Name	Address	Ranking	Ranking Justification[B]
Range Rent-All	35 Midway Drive	Medium	Closed Leak Site, Tank Site, Hazardous Waste Generator
St. Louis County Public Works Garage and Motorpool	7823 TH 135	Medium	Hazardous Waste Generator, Closed Leak Site, Tank Site
Vacant Wooded Land and TH 53 Right of Way	South-southwest of intersection of TH 53 and TH 135	Medium	Past Mining Activities, Potential Waste Generator
Budget Host Inn	1 Midway Drive	Low	Potential Waste Generator
Commercial Property (TH 135)	TH 135	Low	Potential Waste Generator
Dairy Queen	7 Midway Drive	Low	Potential Waste Generator
James Padgett Memorial Fields, Quad Cities Tennis and Undeveloped Tree-Covered Land	1310 5th Ave	Low	Potential Waste Generator
LDS Church	602 13th Street S	Low	Potential Waste Generator
North Ridge Community Credit Union, Century 21, and Exact Eye Care	921 17th Street S	Low	Potential Waste Generator
Single-Family Residential Properties 1[A]	1102, 1104, 1108, 1110, 1112, 1116, 1118, 1120, 1122, 1124, 1202, 1206, 1208, 1210 & 1212 17th Street South; 1701, 1703 & 1705 Cottage Lane; 1803 & 1805 Southern Drive; and 1800, 1802 & 1804 Wolf Road	Low	Potential Waste Generator
Single Family Residential Properties 2[A]	102 10th Street S; 102, 103, 106, 108 & 114 11th Street S; and 104, 107, 108, 111, 112 ½,112, 113, 116, 118, 119, 122 & 124 12th Street S; 10th, 11th, and 12th Streets and S 2nd Ave W	Low	Potential Waste Generator
TH 53, Southern Drive, and Former Railroad Right-of-Way	TH 53 and Southern Drive	Low	Potential Waste Generator
Vacant Commercial Building (Midway Dr)	51 Midway Drive	Low	Potential Waste Generator

[A] Multiple single family residences were counted as a single site in the Phase I ESA.
[B] CERCLIS stands for Comprehensive Environmental Response, Compensation, and Liability Information System
Note: Sites in bold were evaluated in the Phase II ESA.

5.12.3.4 Alternative E-1A

Sixteen of the sites identified in the Phase I ESA (Table 5.12-2) are located within the area of evaluation for this alternative (which includes the RSS, Bridge, Intersection, and Interchange Options), including four high risk, six medium risk, and six low risk sites. Sites in bold were evaluated in the Phase II ESA.

Table 5.12-2. Alternative E-1A Sites with Contamination Risk per Phase I ESA

Name	Address	Ranking	Ranking Justification[A]
Bike Path and Wenonah Properties	**208 and 209 E 8th Street**	**High**	**Past Mining Activities**
Lenci Enterprises, Inc. & Sunrise Equipment Corp.	**1021 S 2nd Ave**	**High**	**VIC (active)**
Vacant Industrial Facility (former Staver Foundry)	**100 10th Street S**	**High**	**Past Foundry Activities, Tank Site, Hazardous Waste Generator, Open Leak Site, CERCLIS site**
Vacant Land and Utility Depot	17th Street S and 6th Ave W	High	VIC site (inactive), Hazardous Waste Generator, CERCLIS site
Landfill Road, Vacant Wooded Land & Bike Trail	North-northeast of intersection of TH 53 and TH 135	Medium	Past Mining Activities, Potential SPILLS Site (closed), Hazardous Waste Generator
Legacy Collision	**1308 S 2nd Ave**	**Medium**	**Tank Site, Hazardous Waste Generator**
Mine/US 53	South and West of US 53	Medium	Past and Current Mining Activities
2nd Avenue Auto Sales & Rental	**1402 S 2nd Ave**	**Medium**	**Tank Site, Hazardous Waste Generator**
St. Louis County Public Works Garage and Motorpool	7823 TH 135	Medium	Hazardous Waste Generator, Closed Leak Site, Tank Site
Vacant Wooded Land and TH 53 Right of Way	South-southwest of intersection of TH 53 and TH 135	Medium	Past Mining Activities, Potential Waste Generator
Commercial Property (TH 135)	TH 135	Low	Potential Waste Generator
Commercial Property (Bourgin Road)	1000 Bourgin Road	Low	Potential Waste Generator
Garage/Pole Barn	**South of intersection of S 1st Ave W and 12th Street S**	**Low**	**Potential Waste Generator**
James Padgett Memorial Fields, Quad Cities Tennis and Undeveloped Tree-Covered Land	1310 5th Ave	Low	Potential Waste Generator
St. Louis County Land & Mineral Department and Undeveloped Tree-Covered Land	7820 TH 135	Low	Hazardous Waste Generator
2nd Ave Business Center	1315 S 2nd Ave	Low	Potential Waste Generator

[A] CERCLIS stands for Comprehensive Environmental Response, Compensation, and Liability Information System
Note: Sites in bold were evaluated in the Phase II ESA.

5.12.3.5 Alternative E-2

Nine of the sites identified in the Phase I ESA (Table 5.12-3) are located within the area of evaluation for this alternative (which encompasses the Straight, Curved Setback, Intersection, and Interchange Options), including two high risk, five medium risk, and two low risk sites. Sites in bold were evaluated in the Phase II ESA.

Table 5.12-3. Alternative E-2 Sites with Contamination Risk per Phase I ESA

Name	Address	Ranking	Ranking Justification[A]
Bike Path and Wenonah Properties	**208 and 209 E 8th Street S**	**High**	**Potential Waste Generator, Former Mining Uses**
Vacant Industrial Facility (former Staver Foundry)	**100 10th St S**	**High**	**Hazardous Waste Generator, CERCLIS Site**
Landfill Road, Vacant Wooded Land & Bike Trail	North-northeast of intersection of US 53 and MN 135	Medium	Former Mine Activities, Potential for Dumping, Closed Leak Site
2nd Avenue Auto Sales & Rental	**1402 S 2nd Ave**	**Medium**	**Tank Site, Hazardous Waste Generator**
St. Louis County Public Works Garage and Motorpool	7823 TH 135	Medium	Hazardous Waste Generator, Closed Leak Site, Tank Site
TriTec of Minnesota, Inc.	210 E 8th Street S	Medium	Past Mining Uses, Hazardous Waste Generator, Closed Leak Site
Vacant Wooded Land and TH 53 Right of Way	South-southwest of intersection of US 53 and MN 135	Medium	Former Mine Activities, Potential for Dumping
Commercial Property (TH 135)	TH 135	Low	Potential Waste Generator
Garage/Pole Barn	**South of intersection of South 1st Avenue West and 12th Street South**	**Low**	**Potential Waste Generator**

[A] CERCLIS stands for Comprehensive Environmental Response, Compensation, and Liability Information System
Note: Sites in bold were evaluated in the Phase II ESA.

5.12.3.6 Phase II Investigation Results and Recommendations

Of the sites listed above, six were assessed during the Phase II investigation, including the Bike Path and Wenonah Properties site (owned by RGGS), Vacant Industrial Facility (former Staver Foundry), Lenci Enterprises, Inc. & Sunrise Equipment Corp, Garage/Pole Barn, Legacy Collision, and 2nd Avenue Auto Sales & Rental. Three sites were recommended for further investigation or consideration by MnDOT due to the following reasons:

- **Vacant Industrial Facility (former Staver Foundry)**
  - Petroleum release with "open" status according to MPCA
  - Elevated concentrations of arsenic, lead, Benzo (a)pyrene (BaP) and DRO detected in soil samples
- **Lenci Enterprises, Inc. & Sunrise Equipment Corp**
  - Elevated concentrations of DRO and BaP detected in soil samples
  - Recently closed petroleum release

- Bike Path and Wenonah Properties (RGGS)
  - Elevated levels of arsenic in a former copper wire salvaging area
  - Man-made debris present
  - Past use as mining facility

Construction activities on these sites would need to consider the potential for encountering contaminated soil and appropriate avoidance and minimization measures (see below).

5.12.4 Avoidance, Minimization, and Mitigation Measures

Taconite Materials Handling

MnDOT's Standard Specification for Construction Manual (MnDOT, 2005) allows taconite tailings from certain areas to be used in bituminous mixtures and as road base. Historically, starting in the 1950s, MnDOT constructed some roadways in northern Minnesota using taconite tailings for aggregate in road base and bituminous. Reconstruction of these roadways requires excavation and handling of taconite tailings. Certain aggregates in the east range of the Biwabik Iron Formation contain minerals that generally resemble asbestos (asbestos-like materials), which are not subject to asbestos regulations.

MnDOT has produced a best practice for management of tailings used in highway construction,[29] recognizing that even though taconite tailings present in this project are not subject to regulation, some reasonable handling techniques are prudent. MnDOT will use its standard regulated materials BMP procedures during construction on this project to limit potential exposure from taconite to the public and to the contractors and employees working on this project. This BMP guidance is included in Appendix I. MnDOT will specify in construction documents that all aggregate materials to be used for project construction will be from sources that are free from asbestos or other contaminants.

The University of Minnesota is conducting a Minnesota Taconite Workers Health Study.[30] This study is taking a comprehensive look at the health of Minnesota taconite workers from the east and west portions of the Mesabi Iron Range. Any available and relevant information from this study regarding potential risks and/or recommended handling of taconite tailings will be reported in the Final EIS.

Potentially Contaminated Sites

A Response Action Plan (RAP) will be completed, as necessary, for the selected alternative prior to any right-of-way acquisition or construction by MnDOT. A RAP would set a protocol for properly handling and treating contaminated soil and/or groundwater that could be handled during construction as identified in the contract special provisions or the RAP.

If necessary, MnDOT may enroll in the MPCA Voluntary Investigation and Cleanup (VIC) Program to obtain regulatory assurances for contamination indicated during Phase II investigations and to obtain approvals for any contamination management and clean-up plans. If necessary, prior to construction activities a MPCA-approved Construction Contingency Plan and/or contract special provision will be developed. In the event that previously unknown hazardous materials are discovered during construction, the Contractor shall notify the Project Engineer immediately and follow the prescribed management protocol contained in the Construction Contingency Plan/RAP or contract special provisions. The materials would be handled in accordance with all appropriate federal, state, and local regulations.

During construction, there is potential for incidental spills of vehicle fluids and/or fuels as a result of normal existing roadway operations or traffic incidents. In the event that any spill is encountered within the project area, the appropriate response protocol required by the MnDOT Technical Memorandum No. 11-10-M-02 would be followed.

[29] MnDOT Regulated Materials Management Section 11, MnDOT Office of Environmental Stewardship, Environmental Investigation Unit, Best Management Practice, Taconite Tailings Road Aggregate

[30] Minnesota Taconite Workers Health Study website: http://taconiteworkers.umn.edu/index.html

Spills

Any potential contaminant spills on the road, such as gasoline, oil, and antifreeze, would be collected within the storm sewer system on the road and conveyed to a treatment pond on the west side of the pit where they could be contained for cleanup; therefore, no contaminants would be directly discharged into the pit. Emergency spills would be cleaned up as identified in MnDOT's Emergency Spill Response Technical Memorandum (MnDOT, April 2011).

5.13 Excess Material

5.13.1 Disposal of Excess Materials

This section covers the general material needs for the project by alternative, noting whether there is expected to be excess material and, if so, the potential for off-site disposal to affect known environmentally sensitive sites near the project. Excess material can be taken off site by the contractor for reuse on other projects, with the exception of taconite.

5.13.2 Sensitive Resources

The Quad Cities and neighboring areas have an abundance of wetlands, lakes, floodplains, and other natural or sensitive areas that are protected by law from indiscriminant filling or grading.

5.13.3 Environmental Consequences

The No Build, M-1, E-1A, and E-2 Alternatives would require proper disposal or reuse of the existing roadway pavement and the top few feet of roadbed from the terminated easement agreement area from which US 53 is relocated. However, no disposal of excess materials would occur in wetlands, floodplains, or other sensitive areas.

Based on preliminary calculations, Alternative M-1 and the Alternative E-1A RSS Option would require a substantial amount of granular material be imported to the project to build the roadways at the necessary elevations due to the expanse of mined area that would be crossed by each. These alternatives would not require disposal of excess material outside of their areas of evaluation. The Alternative E-2 Intersection Option requires less fill material than will be cut, so disposal of excess material outside of the area of evaluation may be required for this alternative.

The amount of cut and fill material for each alternative is listed in Table 5.13-1. For Alternative M-1 and the Alternative E-1A RSS Option, which require a substantial amount of fill import, clean fill sources will be used from locally permitted and approved borrow sites.

Table 5.13-1. Excess Material Generated by Alternative

Alternative		Cut (cubic yards)	Fill (cubic yards)
No Build		0	0
Existing US 53		0	0
M-1		80,000	2,900,000
E-1A RSS Option	Intersection Option	3,300,000	5,000,000
	Interchange Option	3,100,000	5,300,000
E-1A Bridge Option	Intersection Option	650,000	170,000
	Interchange Option	625,000	370,000
E-2 Straight Option	Intersection Option	725,000	630,000
	Interchange Option	700,000	850,000
E-2 Curved Setback Option	Intersection Option	700,000	700,000
	Interchange Option	680,000	925,000

5.13.4 Avoidance, Minimization, and Mitigation Measures

Efforts have been made during alternatives development and preliminary engineering of the various alternatives to minimize cut and fill requirements to the extent possible. Excess materials and debris from this project, such as road pavement or roadbed materials, can be taken off site by the contractor for reuse on other projects, with the exception of taconite. If excess material cannot be reused, under no circumstance will MnDOT approve creation of permit-by-rule landfills for disposal of any waste material. If disposal is required for waste materials resulting from a demolition of a road, this waste will be disposed of in a MPCA permitted demolition landfill. Demolition waste can include concrete, bituminous, untreated wood, masonry, glass, trees, and rock.

If any fill is needed, specifications for the source and nature of the fill used within Virginia's Inner Emergency Response Area (i.e., use of clean fill; use of mining by-products only if low in sulfides) would be required to avoid the potential for contamination impacts to the water supply.

5.14 Geotechnical and Earthborne Vibration

5.14.1 Methodology/Existing Conditions

Section 5.6 describes the background information compiled on geology and soils in the project area. Based on this information, some potential geologic and soils issues were identified that could affect project design and construction techniques. Additional investigations were performed in key areas to provide information on the potential construction feasibility and need for special design techniques, based on issues identified for each alternative. These investigations, available on the project website,[31] include:

- Preliminary Geotechnical Engineering Report for TH 53 Relocation: M-1 Foundations (Gale-Tec Engineering, 2013)
- Proposed TH 53 M-1 (and E-2) Alignment, Virginia, MN: Report of Seismic Study of Mine Blast Induced Vibrations (HDR, 2013)
- Preliminary Geotechnical Engineering Report for TH 53 Relocation: E-1A Alignment – Embankment (Gale-Tec Engineering, 2014)

These studies provide adequate preliminary information to allow for comparison of the alternatives under consideration in this Draft EIS. This information is described in the Environmental Consequences section below. More detailed studies related to these issues will also be conducted to inform final design and will be summarized in the Final EIS.

5.14.2 Environmental Consequences

5.14.2.1 No Build Alternative (Easement Agreement Area Closed)

This alternative involves no new construction or modifications; therefore, no geotechnical or earthborne vibration issues have been identified for the No Build Alternative.

[31] http://www.dot.state.mn.us/d1/projects/hwy53relocation/TechnicalReports.html

5.14.2.2 Existing US 53 Alternative (Easement Agreement Area Remains Open)

This alternative involves no new construction or modifications; therefore, no geotechnical or earthborne vibration issues have been identified for the Existing US 53 Alternative.

5.14.2.3 Alternative M-1

The following areas have been identified that may require special geotechnical design and/or construction techniques to address soil, embankment, and/or vibration-related issues.

The existing embankment area within the Auburn Pit consists of 320 feet or more of material with a range of material sizes that was not compacted or placed to maximize structural stability when it was placed. Mine blasting activities in the vicinity could cause some further consolidation/mixing of this material, resulting in additional settlement. Three locations within the Auburn Pit embankment area have been identified as previous settling pond locations, where fine material has been deposited which could settle or create a weak area susceptible to movement from blasting vibrations in the future. Also, up to 100 feet of additional fill material may need to be added to bring the embankment up to the required grade for construction of Alternative M-1. Therefore, stability and settlement of the existing material is a potential concern; however, there are design options to address the geotechnical challenges in this situation. The area of evaluation for this alternative should be adequate for the potential design options that may be considered to achieve bank/slope stability.

Mining activities would continue near the Alternative M-1 embankment at the mine, resulting in the need to construct the embankment with relatively steep slopes (to minimize the footprint of the roadway within the pit), which may require special design to maintain stability. As mining continues in the future, mine blast faces may approach the base of embankment slopes, creating potential future stability concerns.

The bridge structures on the Alternative M-1 alignment would require relatively tall substructures which may be susceptible to vibrations from future blasting activities. The bridge substructures would likely need to be founded on deep foundations (piling or drilled shafts); however, the large particle sizes in the mine fill embankment would likely make pile driving and/or drilled shafts difficult, adding to project cost.

5.14.2.4 Alternative E-1A

RSS Option

The following areas have been identified that may require special geotechnical design and/or construction techniques to address soil, embankment, and/or vibration-related issues.

The existing embankment area within the Rouchleau Pit consists of up to 100 feet or more of material with a range of material sizes that was not compacted or placed to maximize structural stability when it was placed. Mine blasting activities in the vicinity could cause some further consolidation/mixing of this material, resulting in instability or additional settlement. Also, up to 100 feet of additional fill material may need to be added to bring the embankment up to the required grade for construction of the Alternative E-1A RSS Option. Placing this fill material on top of the submerged haul road in a submerged condition would require substantial efforts to remove or stabilize existing organic material.

Water levels in the Rouchleau Pit will likely vary over time due to dewatering and result in a hydraulic head differential between the east and west sides of the submerged haul road embankment. Therefore, stability and settlement of the existing fill material is potentially a greater concern than for Alternative M-1; however, there are design options to address the geotechnical challenges in this situation. The area of evaluation for this alternative should be adequate for the potential design options that may be considered to achieve bank/slope stability.

Future mining activity, particularly blasting, could impact the existing haul road as well as the constructed slope for the Alternative E-1A alignment. Criteria for future mining would need to be established and addressed in agreements with the mine.

Depending on the depth to rock, the foundations for the future mine access bridge may need to be constructed during RSS construction. Due to the properties of existing fill in the area, the foundations for the bridge may need to be drilled (as opposed to using driven piling) to and into bedrock in order to acquire the necessary bearing capacity and lateral resistance needed for the bridge.

Bridge Option

Potentially tall substructures (piers) for a bridge spanning the Rouchleau Pit for Alternative E-1A may be susceptible to vibrations and flyrock produced by nearby blasting, which could take place in the future if mining operations reconvene in the Rouchleau Pit. The bridge would need to be designed to address both possibilities. Stability of the existing haul road fill and its effects on the bridge foundations constructed on/within the submerged haul road fill is also a concern related to future mining activities, particularly blasting. Criteria for future mining would need to be established and addressed in agreements with the mine to ensure that both the submerged haul road and bridge structure are protected during future mining activities.

Due to the properties of the submerged haul road fill, the foundations for the bridge would need to be drilled (as opposed to using driven piling) to and into the bedrock in order to acquire the necessary bearing capacity and lateral resistance needed for the bridge.

Water levels in the Rouchleau Pit will likely vary over time due to dewatering and result in a hydraulic head differential between the east and west sides of the submerged haul road embankment. Therefore, stability and settlement of the existing fill material along with the associated effects on the foundation elements is a potential concern for bridge foundations.

Both RSS and Bridge Options

DNR mapping of documented underground mines in the project vicinity was reviewed. Documented underground mines are located within the Alternative E-1A area of evaluation, as shown in Figure 5.14-1. Comparisons between LiDAR data and drift elevations recorded on Minnewas underground mine maps suggest that most of the underground workings in the vicinity of Alternative E-1A were removed during subsequent open pit mining. However, mine drifts and slices which were not removed during open pit mining are documented adjacent to but outside of the proposed bridge and roadway footprint of the southbound lane and plot as close as 75 to 170 feet from either centerline (in plan view). Caving methods were employed following underground ore extraction so it is very likely that all mine slices collapsed several decades ago. Though underground workings such as drifts may have persisted, it is unlikely based on depth and proximity to the roadway and bridge structures that their presence would pose a threat at depth nor would a potential subsurface collapse pose a subsidence threat at surface. It is likely that the proposed sites of infiltration ponds located east and west of both the northbound and southbound lanes would overlay or intercept documented underground workings. School Trust land (shown in Figure 2.1-4) has a current lease that allows for the exploration, mining, and removal of non-ferrous resources.

Based on observations from the pit, an area underlying the southbound lane between 150 feet and 450 feet north of the proposed US 53/2nd Avenue intersection appears to be underlain by mine dump fill and glacial till, in descending order. Consequently, this area poses a potential slope stability concern. Additional borings have been acquired from this area with testing and modeling to follow.

5.14.2.5 Alternative E-2 (Straight Option and Curved Setback Option)

The following areas have been identified that may require special geotechnical design and/or construction techniques to address soil, embankment, and/or vibration-related issues.

East of the Rouchleau Pit there is a small pond area within the Alternative E-2 alignment that may require removal of poor/potentially organic soils or some other soil remediation (such as lightweight fill) to prevent potential settlement in this area. Mine dumps were also

encountered in the pond stretch, which, depending on gradation, could also pose a settlement concern.

DNR mapping of documented underground mines in the project vicinity was reviewed. DNR staff indicated that documented underground mines are located outside of the Alternative E-2 (and other project alternatives) area of evaluation, as shown in Figure 5.14-1, or else the mines have been open pit. There is a possibility that undocumented mine(s) could exist in this area.

Potentially tall substructures (piers) for a bridge spanning the Rouchleau Pit for Alternative E-2 may be susceptible to vibrations and flyrock produced by nearby blasting which could take place in the future if mining operations reconvene in the Rouchleau Pit. The bridge would need to be designed to address both possibilities. Stability of the existing fill in the area and its effects on bridge foundations constructed on/within the submerged haul road is also a concern related to future mining activities, particularly blasting. Criteria for future mining would need to be established and addressed in agreements with the mine to ensure that both the mine dump fill and bridge structure remain unharmed during future mining activities.

Due to the properties of existing fill in the area, the foundations for the bridge would need to be drilled (as opposed to using driven piling) to and into the bedrock in order to acquire the necessary bearing capacity and lateral resistance needed for the bridge. Potentially unstable bedrock units are also present in the highwalls and would need to be assessed if foundations are placed in these areas.

Water levels in the Rouchleau Pit will likely vary over time due to mining-related dewatering. Therefore, stability and settlement/down-drag of the existing fill material is a potential concern for bridge foundations.

It is possible that mining could take place in the future east of the pit and on both sides of the future roadway and bridge. Consequently, a peninsula-like bedrock structure as much as 400 to 500 feet tall would remain supporting the roadway and bridge. Stability of this structure is of particular concern since vibrations from mining coupled with perched groundwater could initiate sliding along a weak, northwestward-dipping layer found within the iron formation. An instrumentation plan would likely be implemented to monitor stability within the roadway structure.

Based on observations from the pit, an area underlying the southbound lane between 150 feet and 450 feet north of the proposed US 53/2nd Avenue intersection appears to be underlain by mine dump fill and glacial till, in descending order. Consequently, this area poses a potential slope stability concern. Additional borings have been acquired from this area with testing and modeling to follow.

5.14.3 Avoidance, Minimization, and Mitigation Measures

Efforts have been made during alternatives development and preliminary engineering of the various alternatives to understand the geotechnical constraints. Additional studies will be conducted to obtain more detailed information on the conditions to identify potential concerns more specifically for the preferred alternative. This information will be used to identify measures to avoid, minimize, or mitigate construction/design practices related to potential geotechnical and earthborne vibration issues.

5.15 Climate Change

As described below, the consideration of climate change and greenhouse gas (GHG) emissions is based on Council on Environmental Quality (CEQ) guidance.

5.15.1 Methodology

In February 2010, the CEQ issued draft guidance for addressing climate change in NEPA documents.[32] The guidance indicated that:

[32] "Draft NEPA Guidance on Consideration of the effects of Climate Change and Greenhouse Gas Emissions," February 18, 2010.

"The environmental analysis and documents produced in the NEPA process should provide the decision maker with relevant and timely information about the environmental effects of his or her decision and reasonable alternatives to mitigate those impacts. In this context, climate change issues arise in relation to the consideration of:

(1) The GHG[33] emissions effects of a proposed action and alternative actions; and

(2) The relationship of climate change effects to a proposed action or alternatives, including the relationship to proposal design, environmental impacts, mitigation, and adaptation measures."

Relative to the first consideration listed above, the CEQ's guidance goes on to state that, "in assessing direct emissions, an agency should look at the consequences of actions over which it has control or authority." More specifically, the guidance then notes, "Federal agencies typically describe their consideration of the energy requirements of a proposed action and the conservation potential of its alternatives." The energy requirement to consider for this proposed action is the energy use of vehicles operating on the highway, which will be expressed as a function of change in total vehicle miles traveled (VMT) for purposes of this analysis. The proposed action may result in a change in VMT due to a decrease or increase in travel distances for users of this portion of US 53, since the project would not increase roadway capacity or create any new trips.

With regard to the second consideration listed above (climate change effects), CEQ guidance states, "the focus of analysis should be on the aspects of the environment that are affected by the proposed action and the significance of climate change for those aspects of the affected environment." The effects should especially be considered in areas that are "vulnerable to specific effects of climate change (such as increasing sea level or ecological change) within the project's timeframe." The assessment for this factor focused first on whether any of the resources affected by the proposed project alternatives would likely be affected by climate change (e.g., increasing sea level or ecological change) and, if so, a qualitative assessment of the likely extent of effect from climate change was made. If such resources were identified, a qualitative assessment of the relationship to design, impacts, and mitigation was performed.

5.15.2 Existing Conditions

As described in Section 3.1, Average Annual Daily Traffic (AADT) counts for the existing easement agreement area of US 53 were 22,400 vehicles per day (VPD) in 2009. Forecasts indicate that the AADT in the existing easement agreement area (forecast growth in background travel demand) is expected to increase to 24,200 VPD by 2017 (year of project completion) and 28,650 by 2037.

5.15.3 Environmental Consequences

5.15.3.1 Change in Energy Use

Among the proposed project alternatives, the No Build Alternative has the largest potential for increase in energy use due to an increase in VMT. The No Build Alternative consists of rerouting traffic to a combination of existing roadways, with the primary north-south corridor (Co. 7) located approximately four miles west of US 53, which results in over seven additional miles of travel for vehicles with this alternative (compared to existing conditions). For comparison, the other proposed project alternatives would result in the following trip length changes, compared to existing:

- Existing US 53 Alternative: no change
- Alternative M-1: 0.7 mile decrease
- Alternative E-1A: 0.8 mile increase
- Alternative E-2: 1.4 mile increase

[33] For purposes of CEQ guidance, "GHGs" are defined in accordance with Section 19(i) of Executive Order 13514 (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride).

None of the trip length increases (or decreases) from other project alternatives would result in a noticeable change in vehicle miles traveled; therefore, none would have a substantive effect on global GHG generation.

5.15.3.2 Effects on Resources Affected By Climate Change

A review of the resources affected by the proposed project alternatives compared to resources vulnerable to specific effects of climate change (such as increasing sea level or ecological change) found only one resource that may be affected by climate change and by a project alternative. The forested landscape would be impacted by Alternatives E-1A and E-2, and forest vegetation may be considered a resource vulnerable to the effects of climate change. Section 5.9.3 of this Draft EIS describes the potential project impacts on forested areas along Alternatives E-1A and E-2. There is no known way to predict the potential future impacts on the current type of forest vegetation in this area that may result from climate change. Therefore, the combined effects of the project plus climate change cannot be estimated quantitatively. However, the overall impact on the relatively extensive northern forest ecosystem of Minnesota resulting from the potential loss of approximately eight to 40 acres of forest vegetation from construction of one of the Build Alternatives would not be considered to be substantive.

5.15.4 Avoidance, Minimization, and Mitigation Measures

No avoidance or mitigation measures are proposed since none of the project alternatives are projected to have a substantive effect on GHG emissions (i.e., energy use) or resources affected by climate change.

5.16 Construction Related Impacts

5.16.1 Environmental Consequences and Mitigation Measures

5.16.1.1 Visual and Aesthetics

Visual impacts would occur during construction of all of the Build Alternatives. Temporary visual impacts include the presence of construction equipment and workers, temporary changes in the views experienced by travelers when rerouting is necessary, a decrease in vegetation in some areas, and the addition of increased time in which traffic remains in a certain area due to the increased congestion associated with construction.

5.16.1.2 Economics and Business

To manage impacts on businesses during highway construction, MnDOT will follow guidance in a report developed in response to a law passed by the Minnesota State Legislature in 2008 (Laws of Minnesota 2008, chapter 308). The referenced report (*Open for Business - A workbook to help Minnesota businesses survive and thrive during highway construction,* 2009) can be found on MnDOT's website[34] and provides guidance based on business outreach methods/results, best practices, and lessons learned that can aid local businesses during construction.

5.16.1.3 Utilities

Impacts to utilities are anticipated during construction of each of the alternatives, although these are not impact imposed by MnDOT. Impacts could include utility relocation and/or temporary interruptions in service. MnDOT will coordinate with utility providers.

[34] http://www.dot.state.mn.us/businessimpacts

5.16.1.4 Noise

The construction activities associated with construction of the proposed project will result in increased noise levels relative to existing conditions. These impacts will primarily be associated with construction equipment and pile driving.

Table 5.16-1 shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is primarily associated with site grading/site preparation, which is generally the roadway construction phase associated with the greatest noise levels.

Table 5.16-1. Typical Construction Equipment Noise Levels at 50 feet

Equipment Type	Manufacturers Sampled	Total Number of Models in Sample	Peak Noise Level (dBA)	
			Range	Average
Backhoes	5	6	74-92	83
Front Loaders	5	30	75-96	85
Dozers	8	41	65-95	85
Graders	3	15	72-92	84
Scrapers	2	27	76-98	87
Pile Drivers	N/A	N/A	95-105	101

Source: USEPA and FHWA

Elevated noise levels are, to a degree, unavoidable for this type of project. MnDOT will require that construction equipment be properly muffled and in proper working order. While MnDOT and its contractor(s) are exempt from local noise ordinances, it is the practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to the extent that is reasonable. Advanced notice will be provided to affected communities of any planned abnormally loud construction activities. It is anticipated that night construction may be required to expedite construction, minimize traffic impacts, and improve safety. However, construction will be limited to daytime hours as much as possible. This project is expected to be under construction for two construction seasons.

Any associated high-impact equipment noise, such as pile driving, pavement sawing, or jack hammering, will be unavoidable with construction of the proposed project. Pile driving noise is associated with any bridge construction and sheet piling necessary for retaining wall construction. High-impact noise construction activities will be limited in duration to the greatest extent possible, with the understanding that construction will likely be under an accelerated schedule.

5.16.1.5 Transportation-Related Air Quality

Air quality impacts from construction include increased dust and airborne particulates caused by grading, filling, removals, and other construction activities. Dust impacts would be minimized through standard dust control measures such as watering. After construction is complete, dust levels are expected to return to near existing conditions. Air quality impacts may also result from emissions from construction equipment and possibly from traffic stopped at intersecting roadways or on potential detour routes. These impacts are expected to be minimal and of short duration.

5.16.1.6 Hazardous and Regulated Materials

A management plan would be developed for properly handling, treating, storing, and disposing of solid wastes, hazardous materials, petroleum products, and other regulated materials/wastes that are used or generated during construction. The plan would also establish protocol to minimize impacts to soils and groundwater in the event a release of hazardous substances occurs during construction. If a release were to occur, the Minnesota Duty Officer would be contacted immediately to make the required agency contacts. In the event that any spill of vehicle fluids and/or fuels is encountered during construction, the appropriate response protocol required by the MnDOT Technical Memorandum No. 11-10-M-02 would be followed.

Prior to the demolition of any structures, assessments for asbestos-containing materials, lead-based paint, and other regulated building materials/wastes would be performed. A demolition and disposal plan would be prepared for any identified contaminants that may be encountered during construction.

If used as a construction material on this project, handling of taconite tailings would be completed in conformance with the project special provisions and the MnDOT Guidance Document #36: Best Management Practice: Taconite Tailings Road Aggregate. The guidance document is included in Appendix I.

5.16.1.7 Excess Materials

During construction, if excess material is to be disposed of outside of the project limits, the contractor will develop a disposal plan that must be approved by the MnDOT Project Engineer. Disposal of excess material will be in compliance with the guidelines listed in the standard specifications, including MnDOT specifications, FHWA policies, and environmental laws and regulations. Disposal will not occur in wetlands, floodplains, or other sensitive areas. The contractor would dispose of unusable excavated material in accordance with state regulations and special provisions to ensure protection of wetlands and waterways. All waste and demolition material from project construction activities will be disposed of in accordance with the standard specifications or special provisions to ensure protection of wetlands and waterways. Erosion and sedimentation will be controlled in accordance with temporary and permanent erosion and sediment control plans, MnDOT Standard Plans and standard specifications, and local ordinances.

5.16.1.8 Geotechnical and Earthborn Vibrations

The project may require blasting, pile driving, dynamic compaction, ordinary compaction, and/or pavement breaking or the operation of other construction equipment that may result in temporary earthborn vibrations that have the potential to affect homes. The location and magnitude of construction vibrations cannot be assessed until the final design phase of the project. However, the typical practice is to use vibration monitoring, and if the vibrations reach a certain level, require that the contractor shut down and revise operations to reduce earthborn vibrations. Construction vibration would need to be distinguished from mine generated vibration.

5.16.1.9 Stormwater

The MPCA serves as the permitting authority for stormwater issues related to roadway construction, including a general stormwater permit for construction activity under Phase II of the NPDES. Compliance with the NPDES permit would be met through the use of BMPs to mitigate impacts of roadway construction affecting water quality. Stormwater features would be used for runoff treatment and attenuation, where practical, and determined if necessary during more detailed design of the preferred alternative.

A NPDES permit would be obtained from the MPCA prior to construction. This permit would include an erosion control plan, as well as BMPs contained in MnDOT's standard specifications, details, and special provisions. Special consideration would be given to steep slope areas, specifically in the pit crossing areas (Alternative M-1, E-1A, or E-2) to stabilize long, steep slopes.

After construction, all disturbed areas would be sodded or seeded, leaving temporary erosion control structures in place until vegetation has been established. Erosion and sedimentation of these and all other exposed soils within the project corridor would be minimized by utilizing the appropriate BMPs during construction. Implementation of BMPs in the final construction and site grading plans greatly reduces the amount of construction-related sedimentation and helps to control erosion and runoff. Ditches, dikes, siltation fences, bale checks, and sedimentation basins would be utilized, as needed, as temporary erosion control measures during construction.

5.16.1.10 Water Supply and Waterbody Modifications

Section 5.3 describes dewatering options considered for construction of the Alternative E-1A RSS Option, including a pit drawdown option to allow placement of fill under dry conditions. Potential receiving waters

and impacts for this option are described in Section 5.3. All of the receiving water options from Rouchleau Pit drawdown dewatering operations were analyzed for their capacity to receive the water volume and the potential water quality permit requirements (see Section 5.3). The options that are recommended would be considered water transfers to waters of the state and would not be subject to MPCA water quality permitting, provided that there is no intervening commercial or industrial use of the water and no pollutants are introduced. Other permitting details regarding water appropriations are provided in Section 5.3.4.2.

The piping infrastructure needed to direct water from the Rouchleau Pit to receiving waters would be routed through previously disturbed areas (e.g., existing right-of-way, mined land) to the extent possible. The flexible piping (three 30-inch HDPE pipes) would be laid on top of existing ground for most of the route and removed after construction is complete to limit ground disturbance. The only grading required would be where the pipes cross existing roads, driveways, and railroad tracks, where excavation or boring the pipes through the road would be needed. The extent of the excavation would be limited to the width and depth of the pipes to allow the road/railroad to continue operations. These piping routes were reviewed for other potential environmental resource impacts, are based on routes that follow previously disturbed areas (Figure 5.3-1), and would be in place for a short duration (estimated three months for initial dewatering and up to six months for maintenance dewatering), no potential substantial impacts were identified. Assessment of potential impacts included:

- Cultural: MnDOT CRU reviewed piping routes and concluded no potential adverse effect (see Appendix C)
- Natural: Aerial photos, floodplain maps, and previously gathered data for the Draft EIS were reviewed for the piping routes and concluded there are no floodplains, rare species, parkland, or forested areas within these corridors, thus no potential for impacts
- Water Resources: Because the piping would not result in any permanent placement of pipes and would result in limited physical changes to natural ground (already disturbed areas of roads, driveways, or railroad tracks), there would be no *permanent* wetland impacts, changes to runoff, or other surface water impacts. Receiving waters will have temporary improved water quality through the addition of water from the Rouchleau Pit (see Section 5.3).
- Social: There may be temporary impacts to traffic in areas where the pipes need to be extended/cut under streets, driveways, or tracks

The potential dewatering for the project and resulting impact on groundwater levels would not be expected to cause an issue with operation of wells in the Biwabik Iron Formation within one mile of the Rouchleau Pit, especially considering that the pit historically has had much lower water elevations than 1,275 feet (for example, the pit lake elevation was approximately 1,240 feet in 2000). However, it is recommended that the water levels in these wells be measured before and during dewatering to monitor impacts to the wells. The water level in the wells should be compared to the depth setting of the well pumps.

The construction of any of the Build Alternatives would require a NPDES/SDS Stormwater Construction Activity Permit, which may be covered under the State's Construction Stormwater General Permit. As part of the application process, the owner and operator must create a stormwater pollution prevention plan (SWPPP) that explains how stormwater will be controlled to prevent introduction of sediment and other pollutants transported by runoff.

Any equipment, materials, or personnel coming into contact with the Rouchleau Pit water due to dewatering or construction may transfer aquatic invasive species (AIS) into the Rouchleau Pit. Appropriate measures should be taken to prevent any potential transfers of AIS into the water. Examples include having any equipment or material used for dewatering or construction exposed to dry conditions for at least five days before coming into contact with the waterbody.

5.16.1.11 Traffic

Construction of any of the Build Alternatives would result in minor disruptions to existing traffic since all Build Alternatives include new alignments of US 53, thus constructed away from existing traffic except at the end points and the new intersections/interchanges. Temporary detours or traffic disruptions may occur near Cuyuna Drive, Landfill Road, MN 135, and 2nd Avenue. MnDOT will provide advanced warning for construction in these areas and install clear signage for temporary access and detours. Blasting may be required for construction of each Build Alternative, which could result in some additional temporary road closures similar to those experienced for mine blasting. However, much of the construction for the Build Alternatives is on new alignments and can be constructed with minimal disruption to current US 53 travelers. Blasting, when needed, will be scheduled for minimal traffic disruption.

5.17 Relationship of Local Short-Term Use vs. Long-Term Productivity

All highway projects require the investment or commitment of some resources found in the existing environment. Short-term refers to the immediate consequences of the project whereas long-term relates to its direct or secondary effects on future generations.

5.17.1.1 Potential Adverse Use

Temporary Reduction of Energy and Material Resources

Materials consumed in the construction of any of the Build Alternatives would be unavailable for other uses, including construction of other non-highway related facilities. The energy consumed in the construction, maintenance, and operation of the facility is higher than the energy consumed by the No Build Alternative in the short-term.

Temporary Loss of Vegetation

In addition to permanent loss of vegetation as a result of the Build Alternatives, construction activities would result in additional temporary losses of vegetation adjacent to the roadway improvements. Revegetation activities would be coordinated with other erosion control and stabilization components of the project to minimize impacts. Visual quality would also be considered in selecting appropriate methods and materials for revegetation.

Temporary Loss of Wetlands

The alternatives would directly impact varying amounts of existing wetlands. The impact on wetlands cannot be completely avoided due to the scattered distribution and limited options for realignment due to the presence of active mining areas. However, the preferred alternative design will incorporate avoidance, minimization, and mitigation measures, and compensatory mitigation areas will be discussed in the Final EIS. Compensatory mitigation will assist in minimizing the potential loss of wetland functions and values within the project area.

Temporary Impacts on Water Resources

Alternatives E-1A and E-2 have the potential to create temporary impacts to the Rouchleau Pit by implementing a crossing of the pit. Disruption to this waterbody will be minimized to the extent feasible for the preferred alternative.

Short-Term Economic Impacts

The construction of the relocated highway would require the acquisition of property and would remove this land from tax rolls, resulting in some short-term loss of property tax revenues. This temporary loss is anticipated to be offset by the increased value of land served by the new highway location and ore access. Alternatives E-1A and E-2 would also require full acquisition and relocation of a business. Given the availability of a number of potential replacement sites in the area, short-term loss in tax revenues would be negligible. Temporary changes in the conduct of business may occur until highway

improvements are fully integrated. These impacts will be minimized through wayfinding signage and frequent project schedule updates during construction.

Inconveniences from Construction

Construction would cause minor traffic delays and detours for motorists in the area. This may result in higher levels of congestion.

Significant Capital Investment

Financial commitments to the project include acquisition, relocation, and construction costs. These public dollars would not be available for other uses. In addition, the land converted to highway use represents a reduction in tax base. These costs would be recovered by continuing to provide a transportation facility that would safely maintain adequate roadway capacity and mobility as well as local, regional, and inter-regional connectivity while meeting the terms of the current agreement with RGGS.

5.17.1.2 Long-Term Gains in Productivity

Improve Travel Time and Minimize Cost of Travel

For the Existing US 53 and Build Alternatives, a four-lane highway would have the ability to accommodate existing and forecast traffic volumes. The presence of free-flowing traffic would generally maintain or possibly improve motorist travel times and fuel consumption, which would reduce the overall cost of travel.

The No Build Alternative would reroute traffic onto two-lane roadways and would result in substantial losses in productivity due to increased travel times.

Economic Benefit

The economic advantage lies in the long-term efficiencies that a transportation system will provide. These efficiencies include travel time savings, development opportunities, and increased consumer activity due to enhanced mobility and exposure. With the exception of the No Build Alternative, which would have adverse economic impacts, the Build and Existing US 53 Alternatives maintain the status quo for traffic/travel times and provide possible growth opportunities. The new intersections associated with Build Alternatives may provide opportunity for new highway-related commercial development.

The No Build Alternative is expected to have limited and temporary benefits to select communities (Eveleth), with traffic increases on Co. 101 and Co. 7 heightening the potential for increased opportunity for new businesses and consumer activity at the local level until Co. 101 is closed to through traffic in 2024.

5.18 Irreversible and Irretrievable Impacts

5.18.1 Land Consumption

The amount of land required for the Build Alternatives is similar, ranging from approximately 80 to 154 acres. There would be no acquisition of land required under the No Build and Existing US 53 Alternatives. Land used in the construction of the proposed project is considered an irreversible commitment during the time period that the land is used for a highway facility. Portions of the facility may be subject to easement agreements with the mining operation. The priority of MnDOT and FHWA is to ensure that this current investment in infrastructure is supported by the length of the easement so full use and life of the infrastructure may be realized.

5.18.2 Social and Cultural Resources

The displacement and relocation of residences, businesses, and other resources of the built environment (public and private) are considered to be irreversible and irretrievable. Displacements and relocations are very limited for the project, with displacement of only one business proposed under Alternative E-2 and two businesses under Alternative E-1A.

5.18.3 Energy Resources

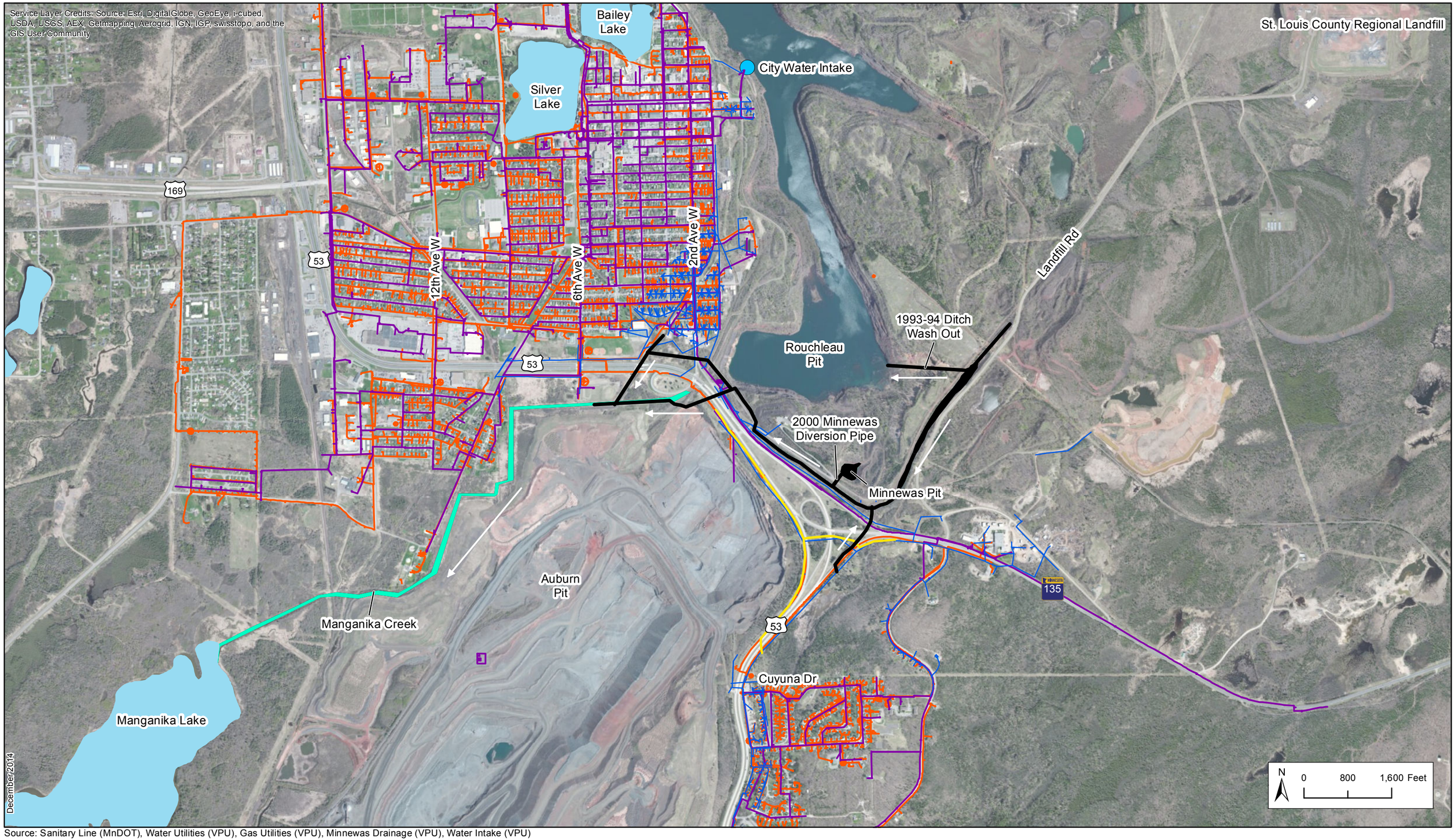
Several energy resources will be committed to plan, design, manufacture materials, and conduct improvements to the highway system. The use of fossil fuels (coal, natural gas, and petroleum), water, and labor expenditures for both construction and maintenance of the facility are considered irreversible and irretrievable. Use of construction materials, such as cement, aggregate, and bituminous material, is generally considered irretrievable; however, these materials are not in short supply, and their use would not have an adverse effect upon continued availability. In addition, some of these materials may have salvage value and may be recycled at the end of the facility's design life.

5.18.4 Financial Resources

The proposed improvements would require a considerable expenditure of both state and federal funds which are not retrievable. While these public funds are not directly retrievable, the money spent can be considered a long-term investment in the economic vitality of the region.

5.18.5 Natural Resources

The proposed improvements may require the commitment of natural resources including the loss of vegetation, wetland functions and values, and other wildlife habitat. The commitment of these resources may in part be irreversible and irretrievable. Avoidance and minimization measures will be incorporated into final design of the preferred alternative. Mitigation measures will be employed in attempt to counter remaining impacts to natural resources.



Source: Sanitary Line (MnDOT), Water Utilities (VPU), Gas Utilities (VPU), Minnewas Drainage (VPU), Water Intake (VPU)

Legend

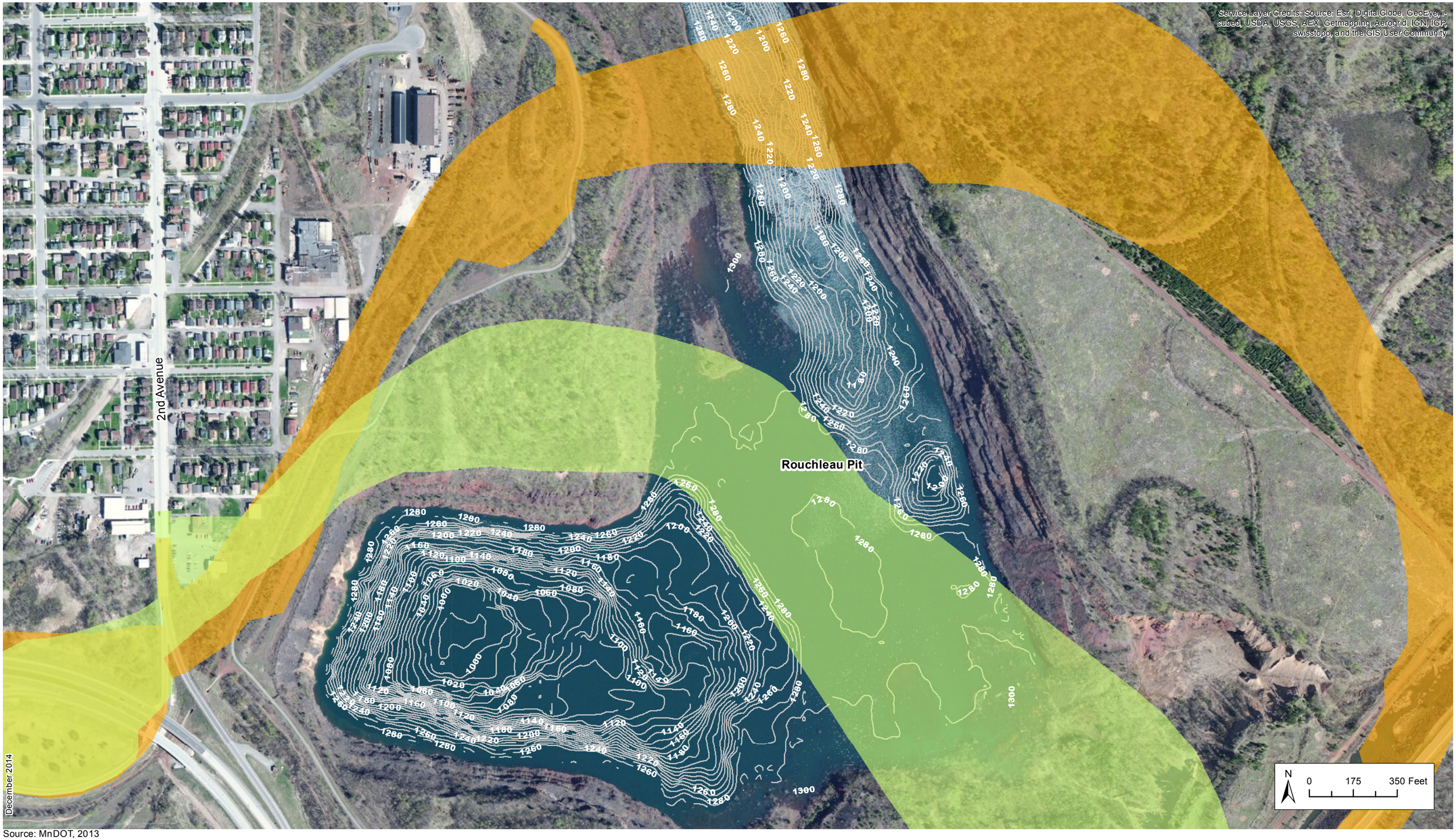
- Sanitary Line
- Power Lines
- Gas Utilities
- Water Utilities
- Stormwater Drainage System
- Manganika Creek
- DNR Public Waters
- City Water Intake
- Direction of Flow

Figure 5.1-1
Known Location of Municipal Utilities in the Study Area
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement

Legend

- Communications Lines
- Overhead Power Lines
- MnDOT Underground Power Lines

Figure 5.1-2
Known Location of Private Utilities in the Study Area
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement

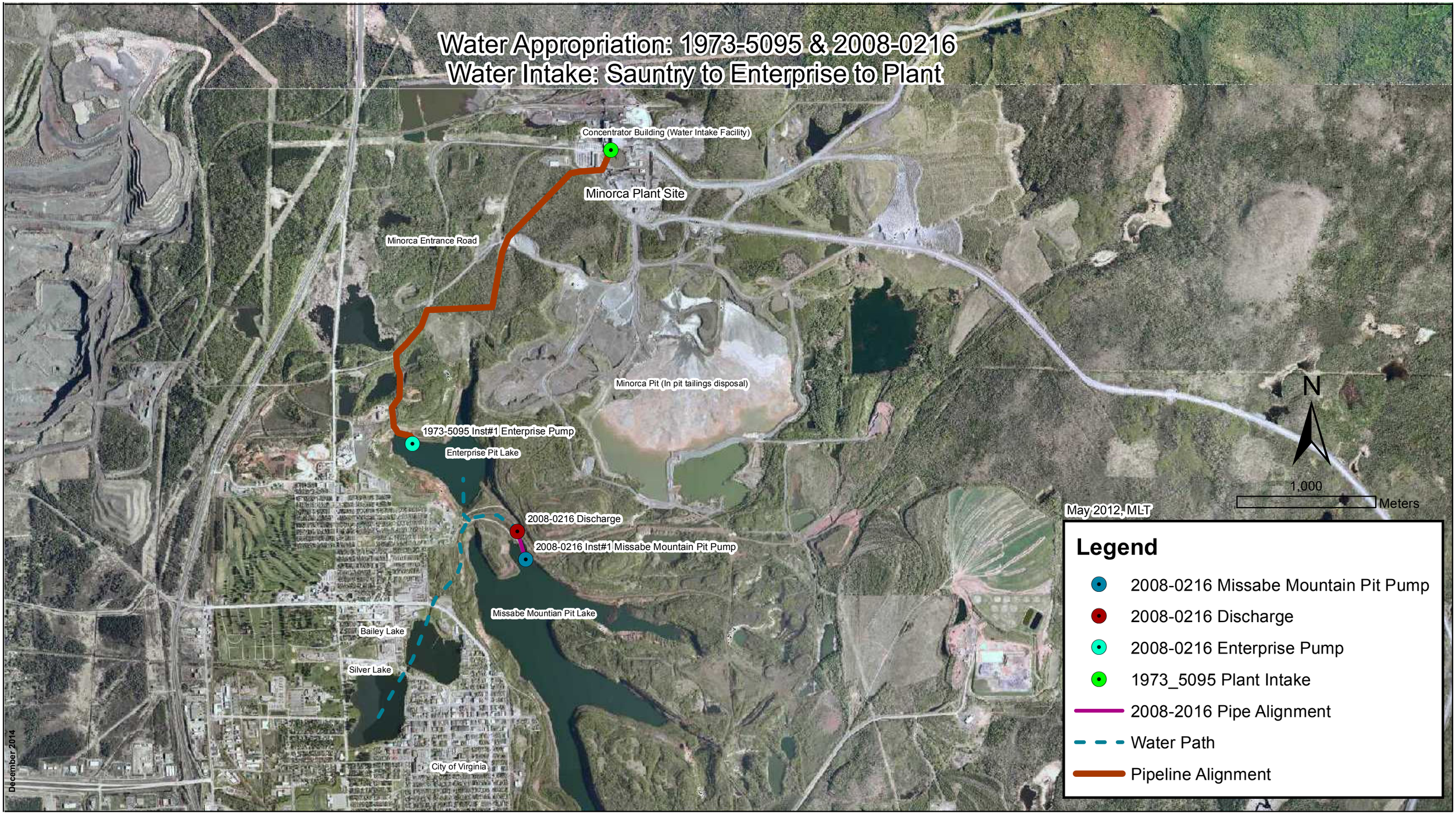


Source: MnDOT, 2013

Legend

- Alternative E-1A Area of Evaluation
- Alternative E-2 Area of Evaluation

Figure 5.2-1
Bathymetric Survey of the Rouchleau Pit
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement



Source: DNR, 2013

Figure 5.2-3
Enterprise Pit Intake Pump/Barge Location
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

ArcelorMittal Intake

City Water Intake
Elevation: 1,117 feet

Natural Land Bridge
Elevation: 1,180 feet +/-

Natural Land Bridge
Elevation: 1,180 feet +/-

Natural Land Bridge
Elevation: 1,180 feet +/-

Submerged Haul Road
Elevation: 1,275 feet +/-

2nd Avenue

Landfill Road

53

December 2014

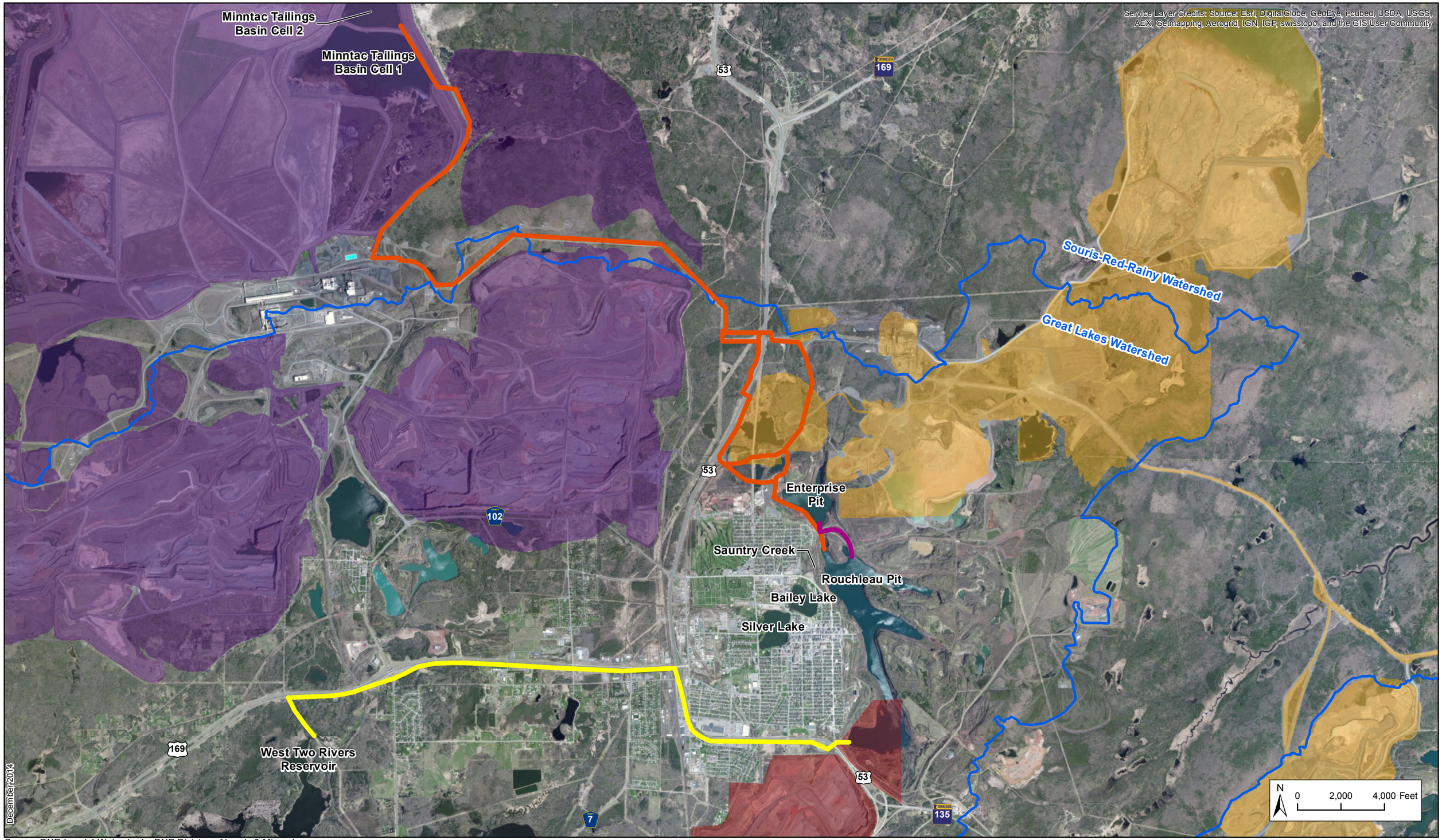
N 0 350 700 Feet

Source: MnDOT, 2013

Legend

- Natural Land Bridges
- Bathymetric Survey
- Existing US 53 Alternative
- Alternative M-1
- Alternative E-1A
- Alternative E-2

Figure 5.2-6
Rouchleau Pit Bathymetric Survey, Natural Land Bridges, and Water Intakes
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement

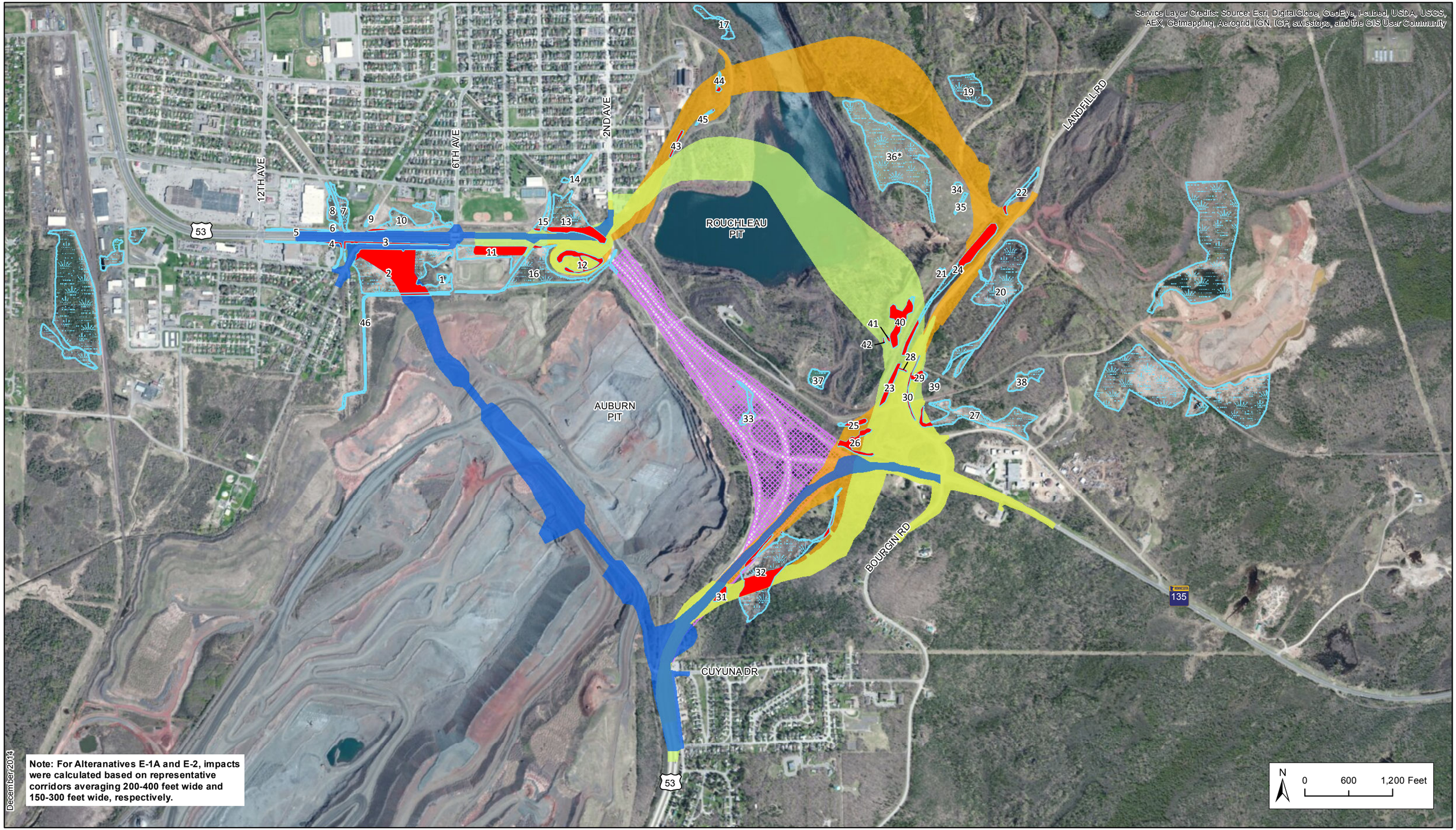


Source: DNR Level 1 Watersheds; DNR Division of Lands & Minerals

Legend

- West Two Rivers Reservoir Option
- Enterprise Pit Option
- Minntac Tailings Basin Cell 2 Option
- Minntac Permit to Mine Boundary
- UTAC Environmental Setting Boundary
- ArcelorMittal Ultimate Permit to Mine Boundary
- Laurentian Divide

Figure 5.3-1
Dewatering Route Options
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement



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Note: For Alteranatives E-1A and E-2, impacts were calculated based on representative corridors averaging 200-400 feet wide and 150-300 feet wide, respectively.

Legend

- Existing US 53 Easement Agreement Area
- Alternative M-1 Area of Evaluation
- Alternative E-1A Area of Evaluation
- Alternative E-2 Area of Evaluation
- Estimated Wetland Boundaries
- Potential Wetland Impacts
- # = Wetland Identification Numbers
- * = Wetland/Upland Complex

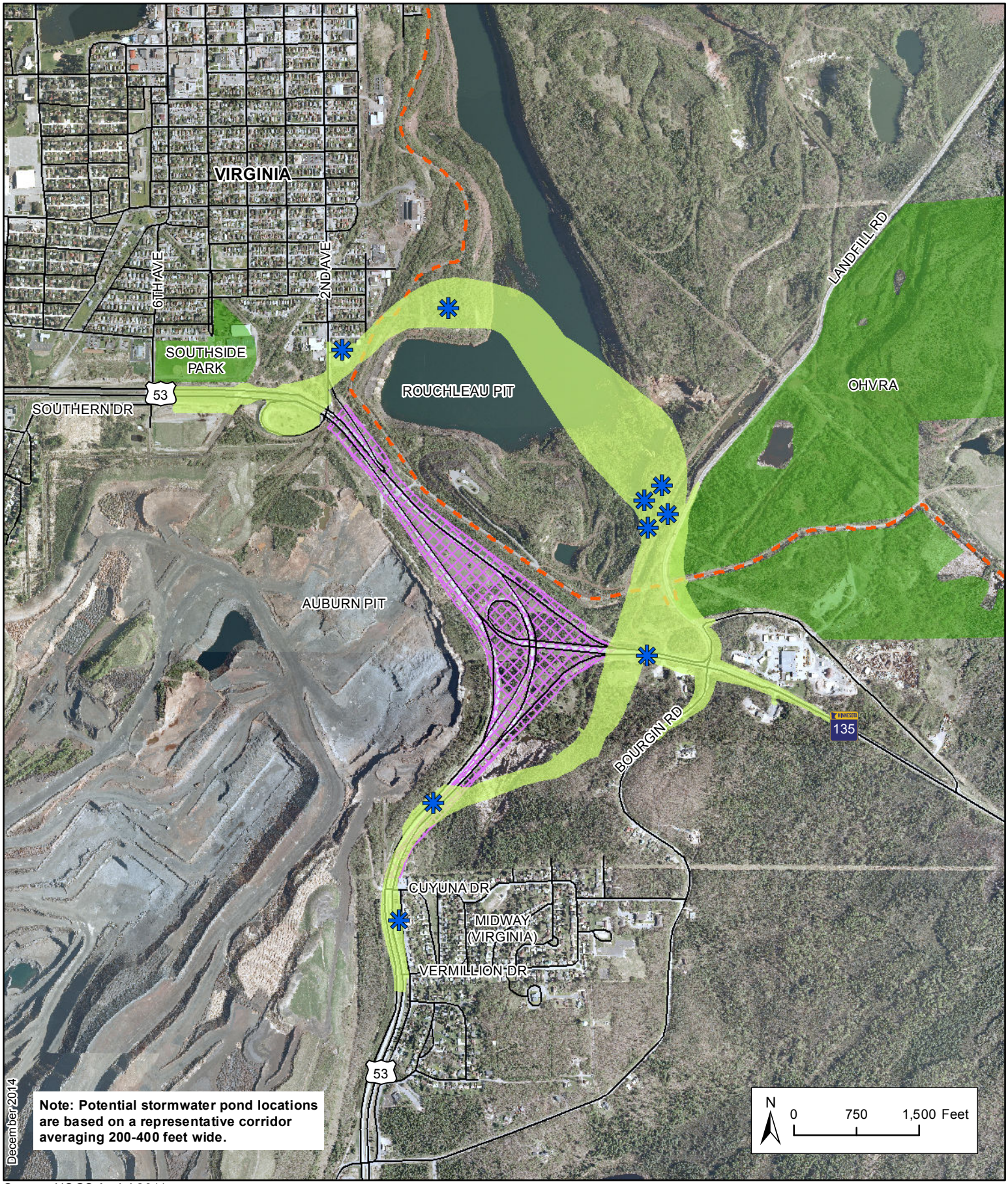
Figure 5.4-1
Wetlands
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement

Source: USGS Aerial 2011

Legend

- Potential Stormwater Pond Locations
- Alternative M-1 Area of Evaluation
- Existing US 53 Easement Agreement Area
- Existing Mesabi Trail
- Existing Public Recreation Land

Figure 5.5-1
Alternative M-1
Potential Stormwater Ponds
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement

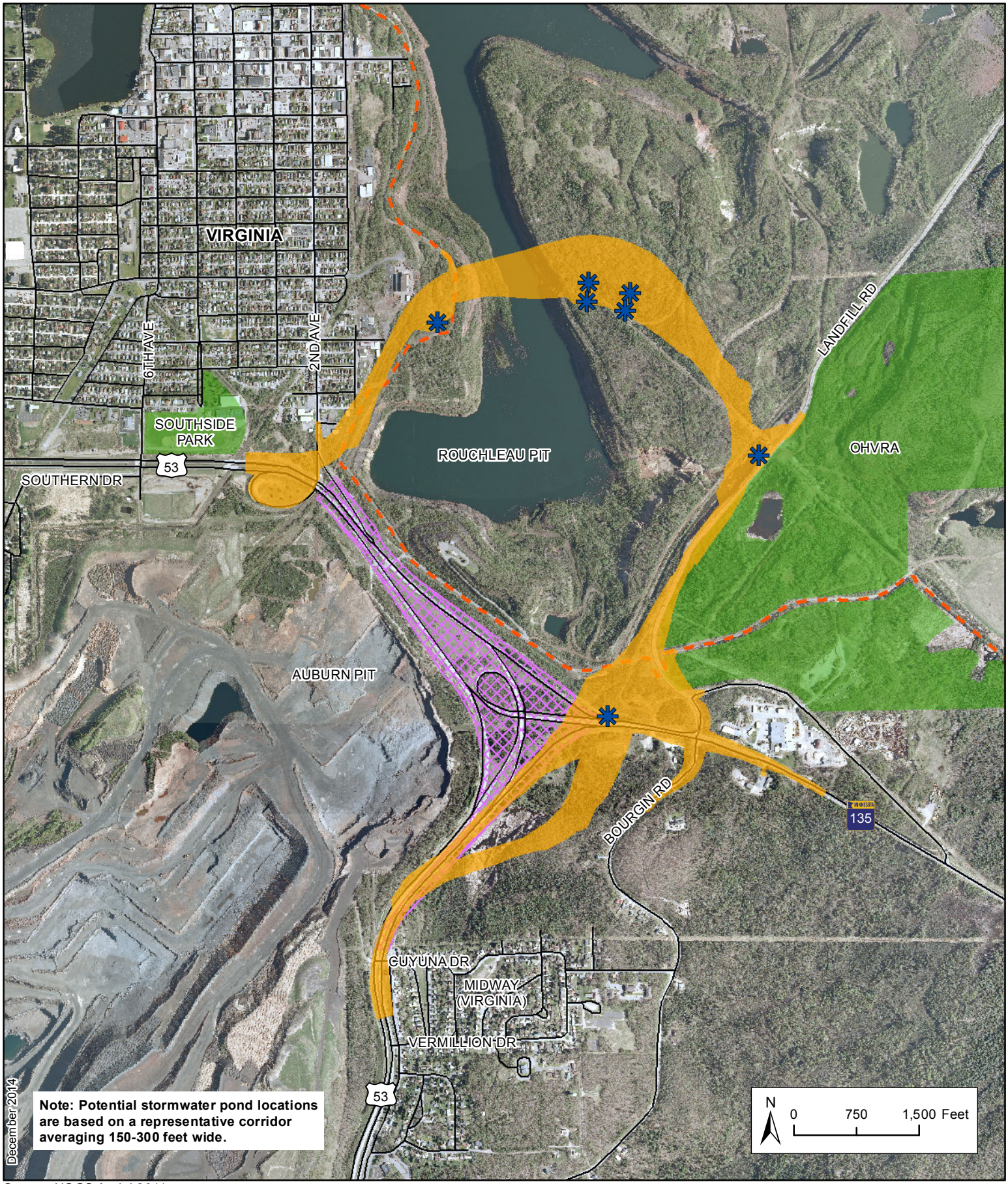


Source: USGS Aerial 2011

Legend

- Potential Stormwater Pond Locations
- Alternative E-1A Area of Evaluation
- Existing US 53 Easement Agreement Area
- Existing Mesabi Trail
- Existing Public Recreation Land

Figure 5.5-2
Alternative E-1A
Potential Stormwater Ponds
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement

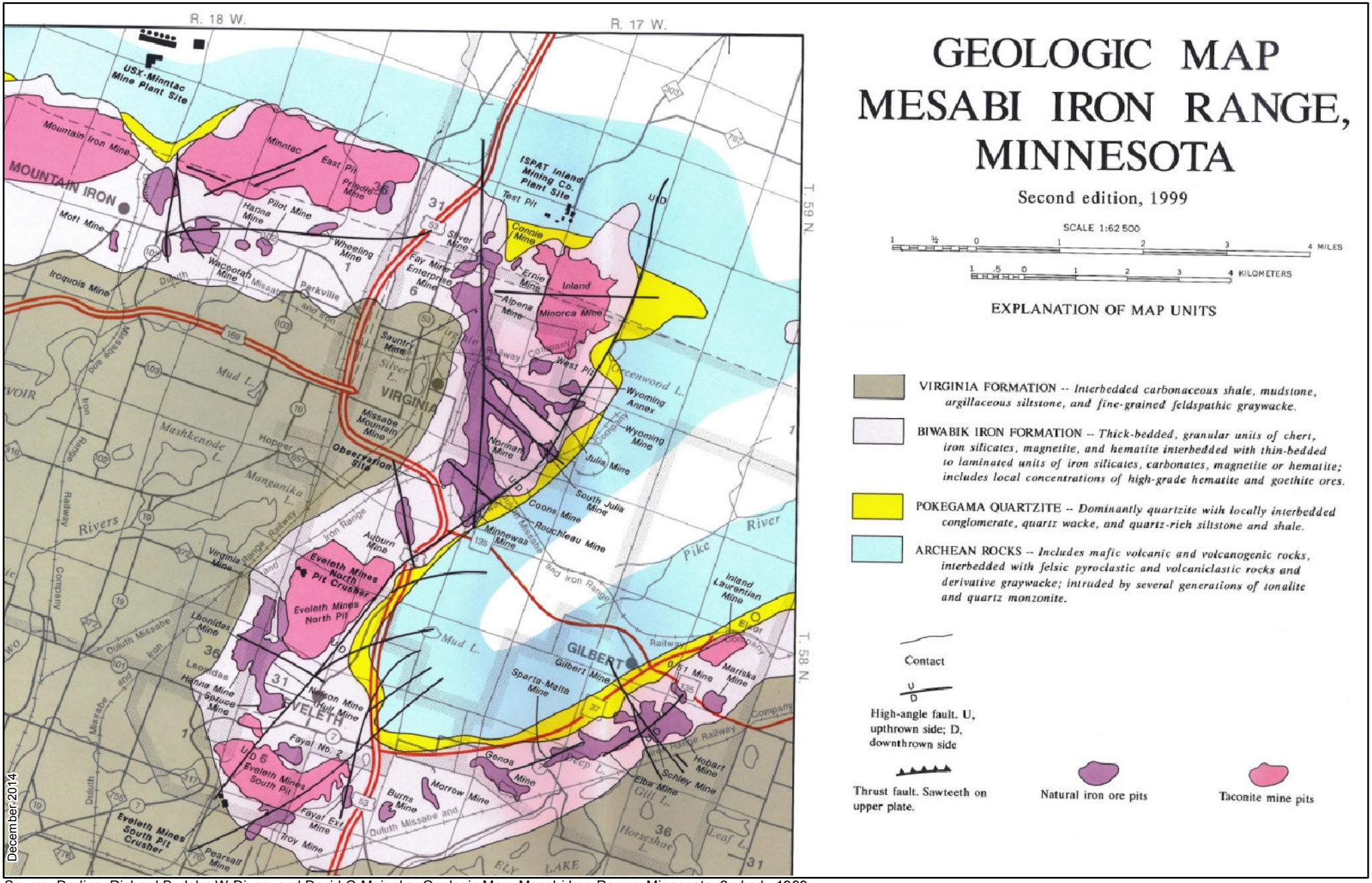


Source: USGS Aerial 2011

Legend

- Potential Stormwater Pond Locations
- Alternative E-2 Area of Evaluation
- Existing US 53 Easement Agreement Area
- Existing Mesabi Trail
- Existing Public Recreation Land

Figure 5.5-3
Alternative E-2
Potential Stormwater Ponds
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement



GEOLOGIC MAP MESABI IRON RANGE, MINNESOTA

Second edition, 1999

SCALE 1:62 500

1 ½ 0 1 2 3 4 MILES

1 .5 0 1 2 3 4 KILOMETERS

EXPLANATION OF MAP UNITS

VIRGINIA FORMATION -- *Interbedded carbonaceous shale, mudstone, argillaceous siltstone, and fine-grained feldspathic graywacke.*

BIWABIK IRON FORMATION -- *Thick-bedded, granular units of chert, iron silicates, magnetite, and hematite interbedded with thin-bedded to laminated units of iron silicates, carbonates, magnetite or hematite; includes local concentrations of high-grade hematite and goethite ores.*

POKEGAMA QUARTZITE -- *Dominantly quartzite with locally interbedded conglomerate, quartz wacke, and quartz-rich siltstone and shale.*

ARCHEAN ROCKS -- *Includes mafic volcanic and volcanogenic rocks, interbedded with felsic pyroclastic and volcaniclastic rocks and derivative graywacke; intruded by several generations of tonalite and quartz monzonite.*

Contact

U D

High-angle fault. U, upthrown side; D, downthrown side

Thrust fault. Sawteeth on upper plate.

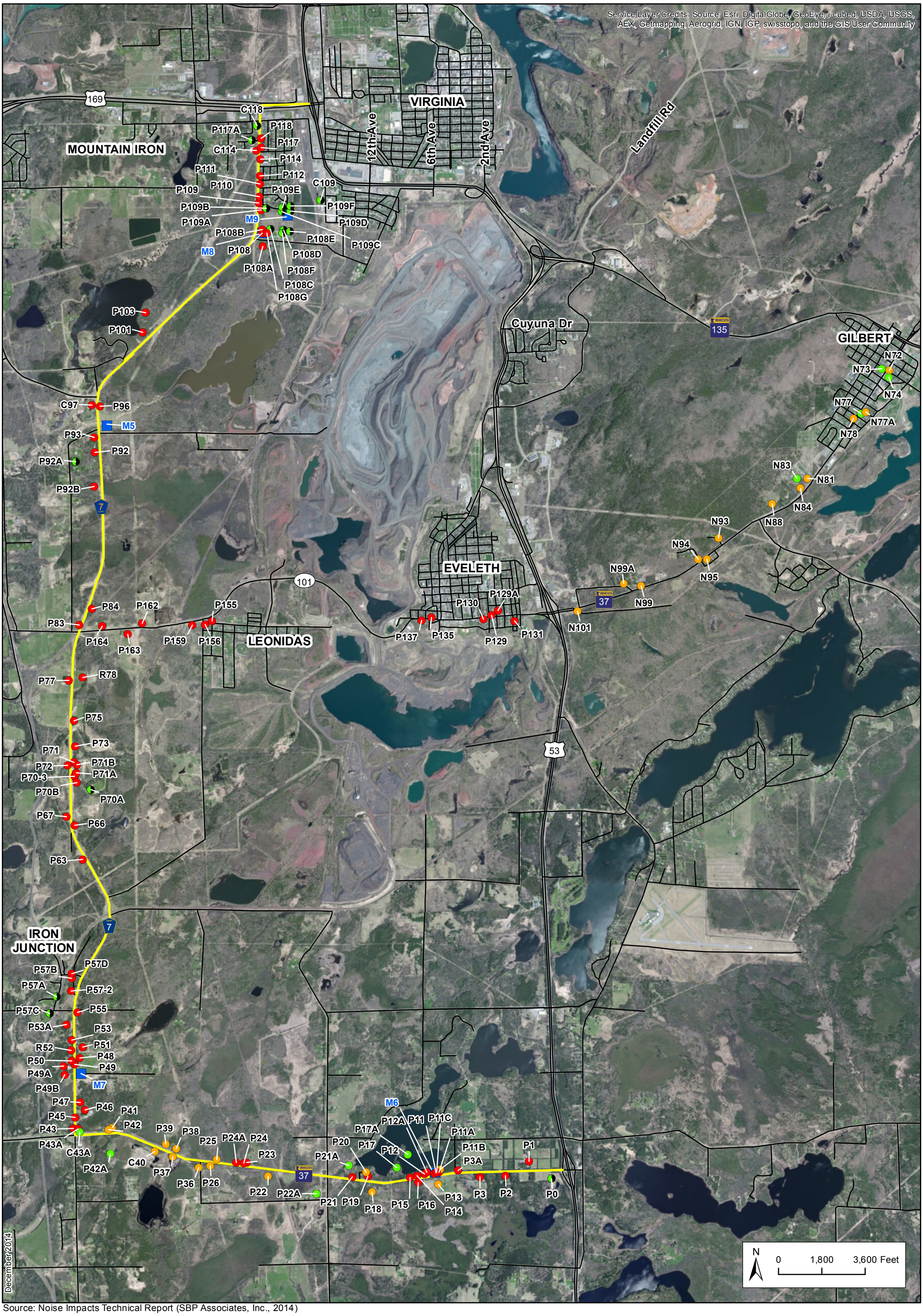
Natural iron ore pits

Taconite mine pits

December 2014

Source: Darling, Richard B, John W Dixon, and David G Meineke. Geologic Map, Mesabi Iron Range, Minnesota. 2nd ed., 1999.

Figure 5.6-1
Geologic Map of the Project Area
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement



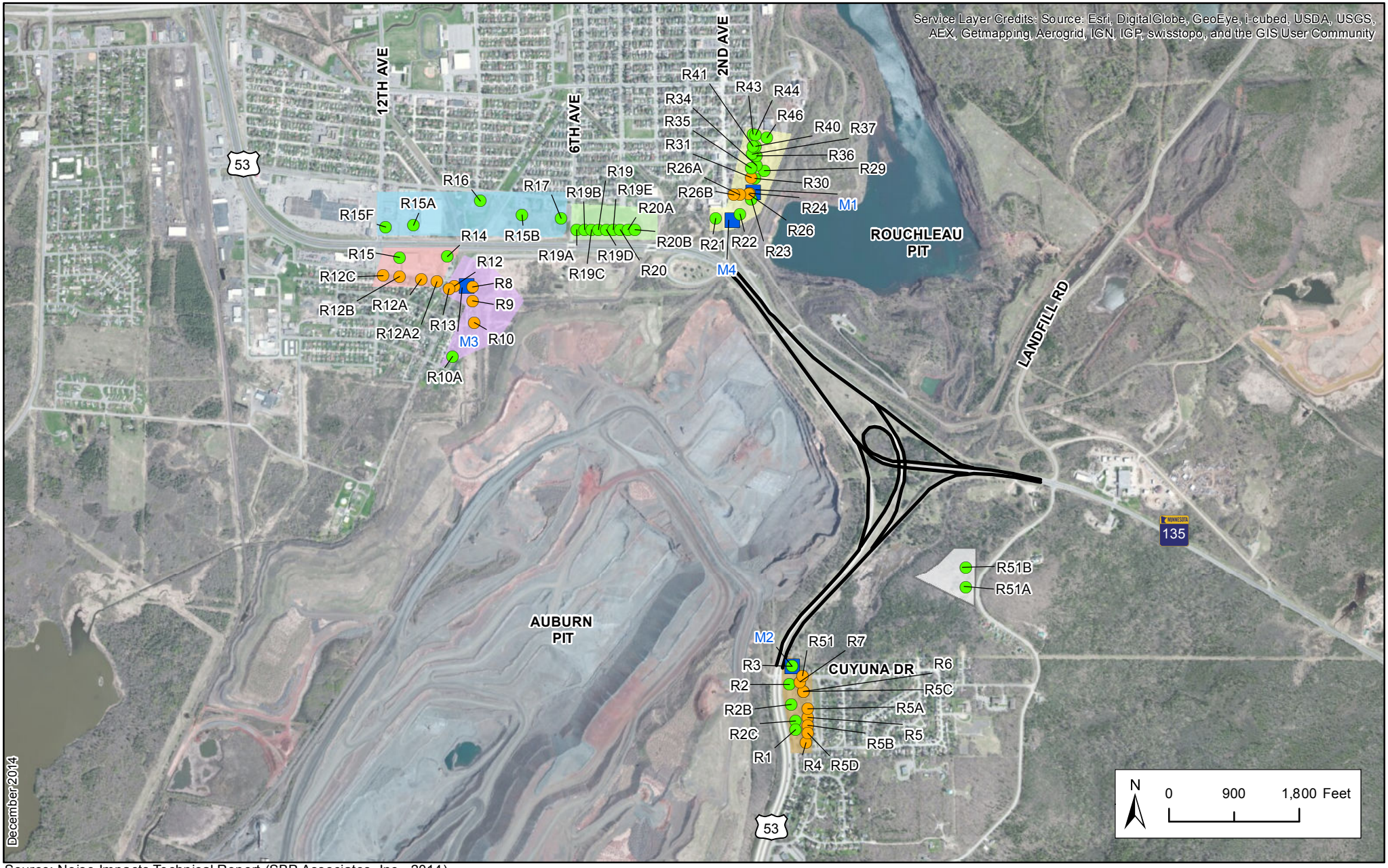
Source: Noise Impacts Technical Report (SBP Associates, Inc., 2014)

Legend

- Receptors that would not exceed state noise standards
- Receptors that would not exceed state noise standards but would have a noise level increase >= 5 dBA
- Receptors that would exceed state noise standards
- Receptors that would exceed state noise standards and have a noise level increase >= 5 dBA
- Monitoring Locations
- No Build Alternative

December 2014

Figure 5.7-1
No Build Alternative Noise Impacts
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement



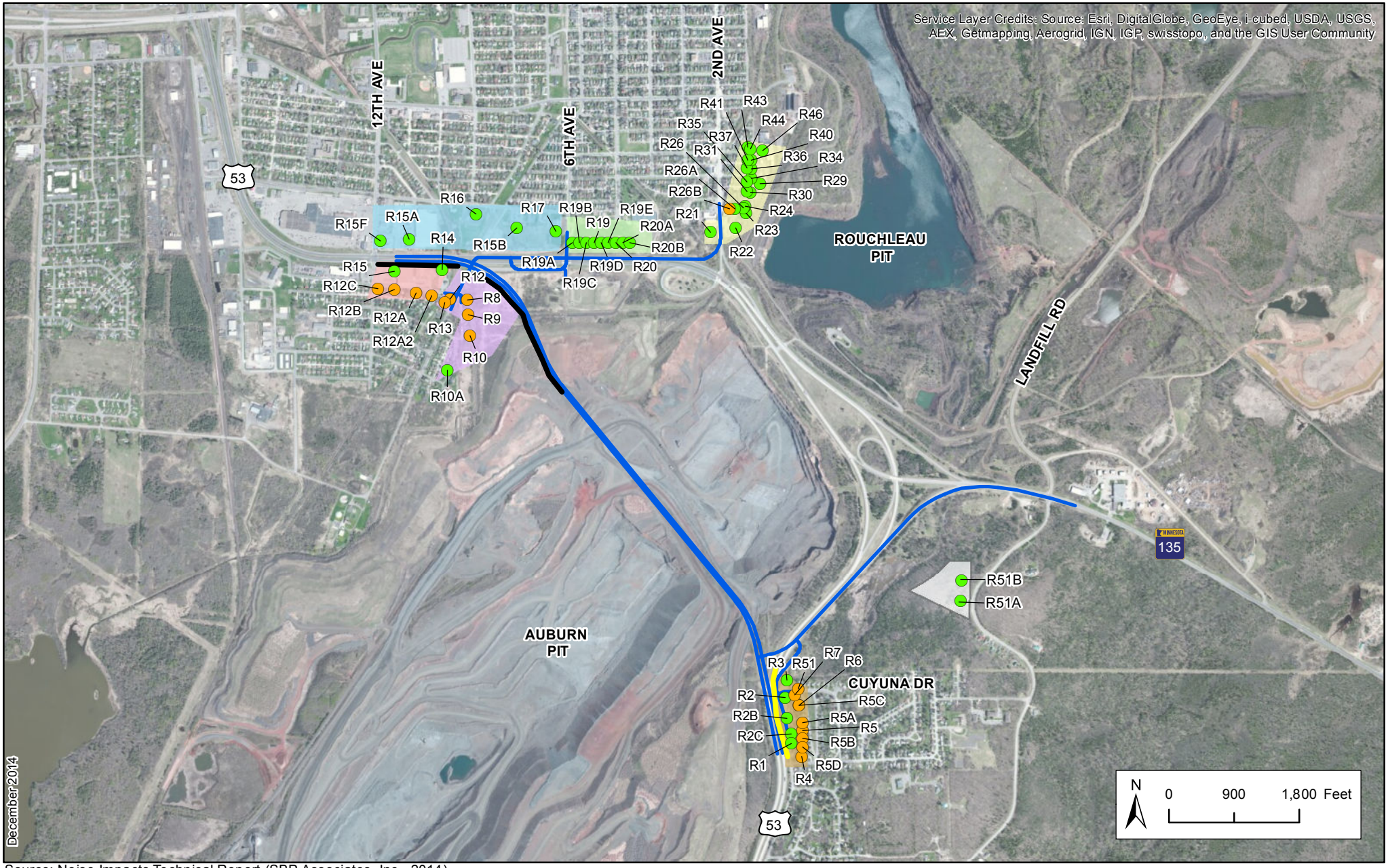
Source: Noise Impacts Technical Report (SBP Associates, Inc., 2014)

Legend

- Existing US 53 Alternative
- Monitoring Locations
- Receptors that would not exceed state noise standards
- Receptors that would exceed state noise standards (generally represents existing conditions)

- Area A
- Area B
- Area C
- Area D
- Area E
- Area F
- Area G

Figure 5.7-2
Existing US 53 Alternative Noise Impacts
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement

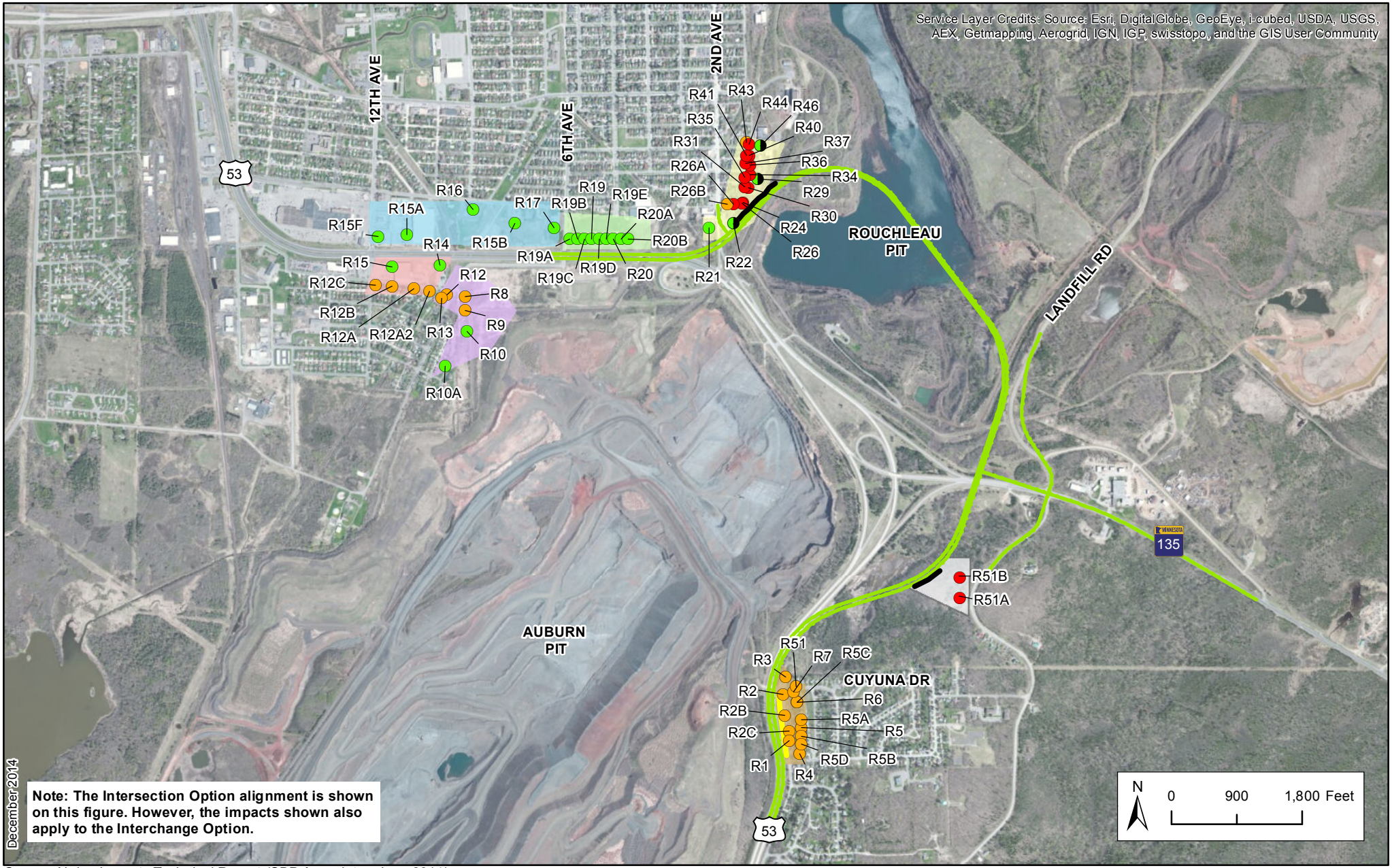


Source: Noise Impacts Technical Report (SBP Associates, Inc., 2014)

Legend

- Alternative M-1
- Receptors that would not exceed state noise standards
- Receptors that would exceed state noise standards
- Not Feasible and Reasonable Noise Walls
- Feasible and Reasonable Noise Walls
- Area A
- Area B
- Area C
- Area D
- Area E
- Area F
- Area G

Figure 5.7-3
Alternative M-1 Noise Impacts
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement



Source: Noise Impacts Technical Report (SBP Associates, Inc., 2014)

Legend

- Receptors that would not exceed state noise standards
- Receptors that would not exceed state noise standards but would have a noise level increase >= 5 dBA
- Receptors that would exceed state noise standards
- Receptors that would exceed state noise standards and have a noise level increase >= 5 dBA

- Area A
- Area B
- Area C
- Area D
- Area E
- Area F
- Area G

- Feasible and Reasonable Noise Walls
- Not Feasible and Reasonable Noise Walls
- Alternative E-1A

Figure 5.7-4

Alternative E-1A Noise Impacts

US Highway 53 Virginia to Eveleth

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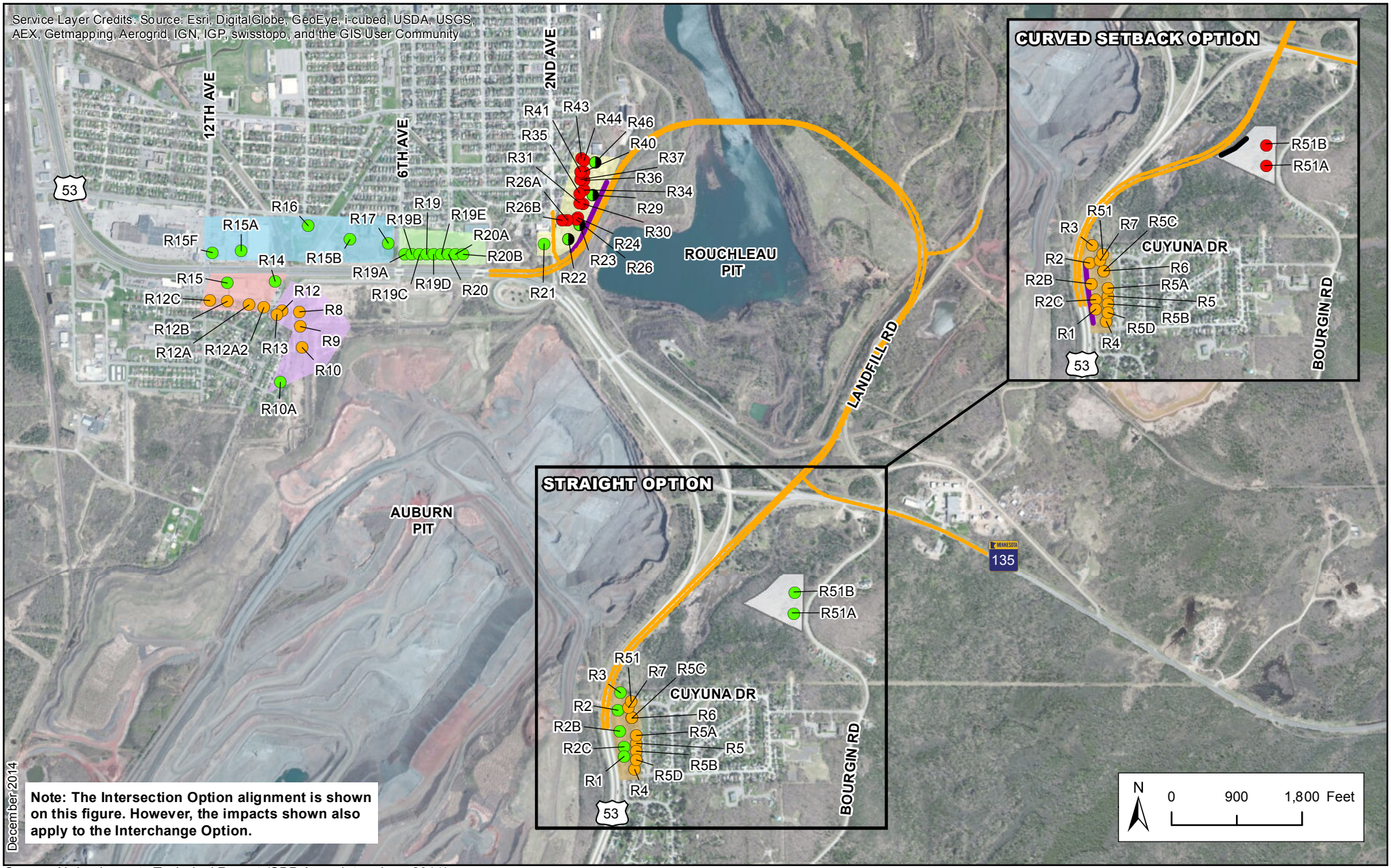

Source: Noise Impacts Technical Report (SBP Associates, Inc., 2014)

Legend

- Receptors that would not exceed state noise standards
- Receptors that would not exceed state noise standards but would have a noise level increase >= 5 dBA
- Receptors that would exceed state noise standards
- Receptors that would exceed state noise standards and have a noise level increase >= 5 dBA

Area A, Area B, Area C, Area D, Area E, Area F, Area G

Alternative E-2

Feasible and Reasonable Noise Walls

Not Feasible and Reasonable Noise Walls

MINNESOTA DEPARTMENT OF TRANSPORTATION

Figure 5.7-5

Alternative E-2 Noise Impacts

US Highway 53 Virginia to Eveleth

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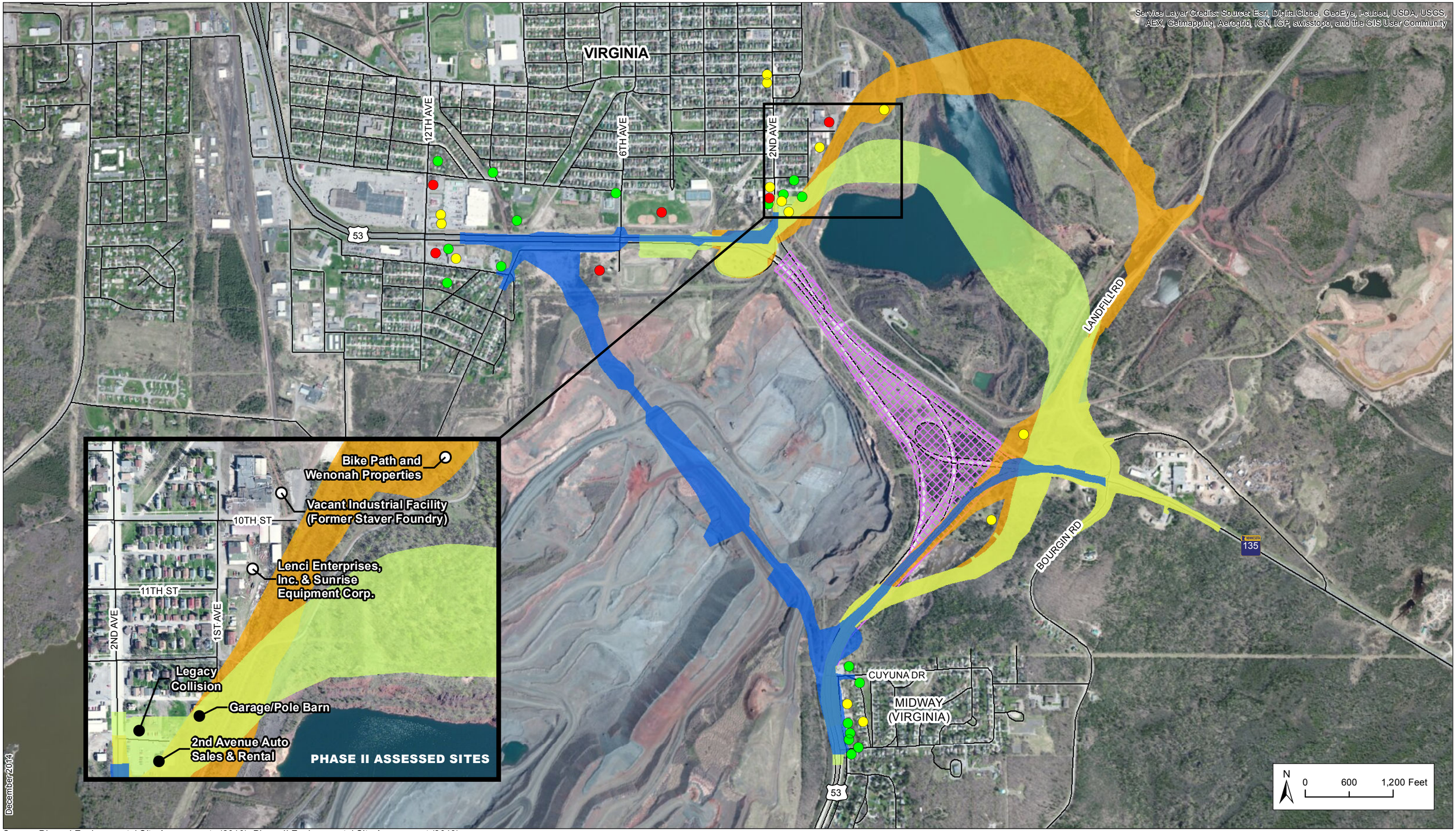


Source: Phase I Environmental Site Assessments (2013); Phase II Environmental Site Assessment (2013)

Legend

- Alternative M-1 Area of Evaluation
- Alternative E-1A Area of Evaluation
- Alternative E-2 Area of Evaluation
- Existing US 53 Easement Area

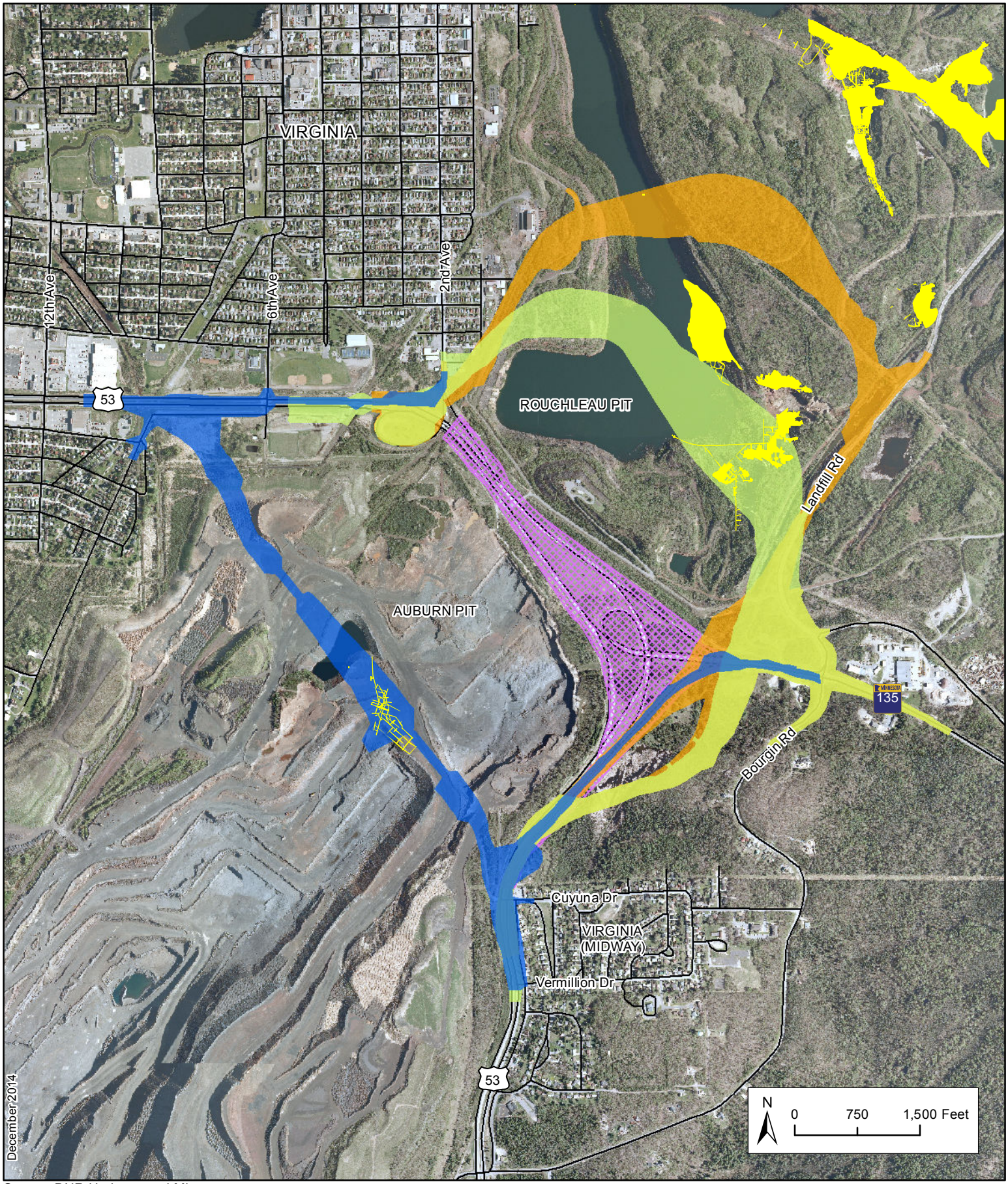
Phase I Identified Sites

- High Risk
- Medium Risk
- Low Risk

Phase II Assessed Sites

- Further Investigation Recommended
- No Further Investigation Required

Figure 5.12-1
Contamination Risk Sites
US Highway 53 Virginia to Eveleth
Draft Environmental Impact Statement



Source: DNR Underground Mines

Legend

- Mapped Underground Mines
- Alternative M-1 Area of Evaluation
- Alternative E-1A Area of Evaluation
- Alternative E-2 Area of Evaluation
- Existing US 53 Easement Agreement Area

Figure 5.14-1
Location of Mapped Underground Mines
US Highway 53 Virginia to Eveleth
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